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ORIGINAL COMMUNICATIONS.

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FACIAL RECONSTRUCTIVE SURGERY; WITH PRE- SENTATION OF CASES AND LANTERN SLIDE DEMONSTRATION.*

DR. JACQUES MALINIAK, New York City.

Reconstructive surgery of the face deals with the anatomical and functional correction of congenital and traumatic deformities and those resulting from infections. This type of surgery is far from being new. Already in ancient times, surgeons were concerned not only with the removal of diseased tissues, but also with the repair of post-operative defects, and the treatment of congenital and acquired deformities. Thus, Celsus, who lived before the Christian era, described his method for the correction of cleft palate.

In the sixteenth century Ambroise Paré and Tagliacozzi described surgical methods in this field, which are still of great interest to us. Tagliacozzi's, or the so-called Italian method in rhinoplasty, is classical and continues to be in use without great modification (Fig. 1). The writings of Carpue, Dűffenbach, von Langenbeck, Thiersh, Reverdin, Shimanowsky and many others prove, that the study of facial reconstructive surgery was pursued unremittingly during the entire nineteenth century. The results, however, were far from encouraging, as is shown by the saying of Denonvillier, a distinguished surgeon of those days, that in rhinoplasty "the surgeon only substituted ridiculous infirmity for a loathsome deformity." It was only when a large amount of material afforded by millions of facial

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wounds had become available in the world war, that the different methods could be applied, followed up and standardized. Large centers of maxillo-facial reconstructive surgery were organized in all the armies and only after years of this work, that more or less definite methods were worked out and results crowned the efforts.

We continue at the present time to apply our knowledge gained in the late war to the treatment of every-day deformities. Many of these deformities may be avoided and I should like to insist on this point, which seems to me to be much neglected in works dealing with this subject.

In these days of prophylactic medicine, it seems natural that some attention should be given to the prevention of facial deformities. It



Fig. 1.

Illustration from Tagliacozzi's work, "De Curtorum Chirurgia per infitionem," which appeared in sixteenth century, showing the Italian method of rhinoplasty. This method remained classical and is still used.

is, therefore, very necessary that the fundamental principles of the subject should be made known to the general public. How many traumatic and post-operative deformities of the face could be avoided if the medical profession at large and the public knew more about this line of work. The laity should know enough about the prevention of facial disfigurements to avoid the omnipresent quack and all the disasters that follow "beauty cures."

Post-graduate work in this line is needed.*

*Courses on this subject have been arranged by us at the Cincinnati Medical School, and in connection with the Kings County Medical Society. Similar work is being started at different medical centers here and abroad.

Traumatic Nasal Deformities: Nasal deformities are extremely common on account of sports, which have such an important place in schools and the whole life of the nation. These, as well as automobile accidents and industrial injuries, are the usual causes of nasal fractures. The injuries are generally not seen at the beginning by the qualified reconstructive surgeon, and too often indifferent methods of treatment are applied. As the pain in the fractured region is always acute, the patient listens with a complaisant ear to the advice to postpone the reduction of the fracture to a later date. Very often, also, the nasal fracture is masked by edema and an early diagnosis is not made. A radiograph is always useful in case of doubt, when the displacement of fragments is slight.

The treatment of recent fractures of the long bones is standardized at the present time throughout the world. Immediate reduction and

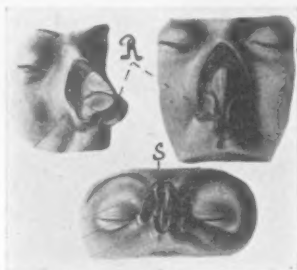


Fig. 2.

At R, the quadrangular cartilage is situated directly under the skin. At S, the free border of the same cartilage constitutes the principal support for the nasal tip.

immobilization of the fragments is considered urgent. The anatomical and functional restitution of the fractured parts is the principal care of the surgeon. Why such a difference of opinion in regard to nasal fractures? Is function and shape less important in the nose than in the arms or legs? The nasal obstruction that follows a badly set nasal fracture compromises the normal function of the middle ears, the respiratory tract and eventually the entire body. A permanently disfigured face is certainly not less damaging to the individual than a malposition of a fracture of the arm. Left to themselves, these bony fragments become fixed in a vicious position by the exuberant callus. The escaped blood organizes during the first week and the cicatricial tissue, which results from it, renders late reduction in the course of the second week already difficult. The fractured fragments should be carefully kept in connection with the periosteum.

If enclosed, they should be mobilized. The fractured or luxated septum should be replaced with the same care. Systematic endonasal packing will maintain the fragments from within. A copper or lead splint prepared after a pattern must be applied externally.

The correction of an old nasal fracture is far more tedious.² No correction of the deformity is possible without the resection of a fragment from the frontal process of the maxillary bone on the flat side, and the infraction on the opposite side of the nose. The latter is thus easily replaced into the normal position and immobilized.



Fig. 3.

Facial change of expression in the same profile with a different nasal shape.

Nasal Deformities After Submucous Resections: Deformities very frequently occur after a submucous resection of the septum, and this should all the more be taken into consideration, as this operation is one of the most frequent nasal procedures. The deformity which results is generally very conspicuous, and as it closely follows the operation, the relation of cause and effect is evident to the patient. In the majority of cases, the operative technic is at fault. The details on this subject were described by me elsewhere,¹ and here I wish only to make the following remarks:

On account of the lack of reinforcement of the septum by the triangular cartilage immediately above the nasal tip (Fig. 2), the remnant of the cartilaginous bridge, if insufficient, is liable to break down under the slightest trauma and a dorsal depression follows. The cartilaginous bridge after a submucous resection should be at that level at least one-half inch high. The free edge of the quadrangular cartilage forms a part of the pillar for the nasal tip, and if resected at one of its ends, produces a flattening of the latter.

Indirectly, an acute or chronic nasal infection during a submucous resection may cause a post-operative nasal deformity through involvement of the operative field and necrosis of the remaining cartilage. The nasal condition should, therefore, be thoroughly investi-



Fig. 4.

Miss R. W., age 26 years. Oversized nose in which the length, width and height have been remodeled in harmony with the face. Striking change in facial expression. (Patient presented at the meeting.)

gated before the operation and the latter postponed in case of free pus or acute catarrh.

After a submucous resection, the two plates of the mucosa are to be held in place for twenty-four hours by a metal splint, which we always apply, thus assuring a uniform pressure and avoiding the formation of a hematoma with resulting infection. The plugging of the nasal fossae and a pronounced discomfort are thus avoided. It goes without saying that, in so doing we add to the advantages mentioned above the free circulation of air in the middle ears, the absence of stagnation of pus in the nasal cavities and pharynx, with the possibility of descending infection (tonsillitis, laryngitis, etc.). When a post-operative deformity appears (dorsal depression or flattening of nasal tip) its correction is the same as in the congenital deformities, of the same type, about which we shall speak below.

Congenital Nasal Deformities: As the nose is the distinctive feature of the human face, the least deviation from normal produces a change of facial expression. Partial or total defects of the nose are among the worst deformities that exist. Deformities of the ear, the forehead or the chin may be masked, but those of the nose are always striking (Fig. 3). Therefore, it is not surprising that the minds of those patients are anxiously fixed on their deformity, causing mental depression. They are handicapped in their work and social life, and their mental distress exaggerates in their minds the importance of their physical deformity. In the past, because of their mental depression, these patients were considered hypochondriacs and the necessity of cosmetic operations was questioned. At the



Fig. 5.

Miss S., age 21 years. In addition to the deformity similar to that of Fig. 4, this girl presented a fullness and dropping of the nasal tip, which greatly affected the expression of the mouth. (Patient presented.)

present time, corrective rhinoplasty has been shown to be successful, and the series of patients, which I shall present to you this evening, bears witness to this. Comparing the contour and expression of their faces with the pre-operative photographs, and casts, you will readily realize the moral, professional and social importance of rhinoplasty.

Technic: For the details of the technic, I shall have to refer you to my previous publications^{2,3} Here I wish only to state the cardinal principles.

Local anesthesia is the rule in these operations. Ordinarily, I use the endonasal route. The nasal cavities should, therefore, be carefully examined, and infection excluded before operation. In case of

a chronic infection (ozena, sinusitis), the external route is preferable, with incision in the columella or eyebrow. In an oversized nose, the length, height and the width should all be taken into consideration, and the remodelled nose made in complete harmony with the entire face (Figs. 4, 5). *An artistic sense is not less needed in this work than a perfect technic.* The osteocartilaginous prominence of the nose is removed with a saw. This correction can be made also by the removal of triangular fragments, on each side, from the frontal processes of the maxillary bones and the septum. It is the procedure of lowering the dorsal prominence.



Fig. 6.

Miss G. G., age 24 years. a. Came under my observation two years after a correction of a saddle deformity by means of a guttapercha transplant. Localized abscesses appeared one year afterwards and had to be incised repeatedly. b. The guttapercha has been removed by me by endonasal way. In a second stage a costal cartilaginous graft was used for correction of dorsal depression. The healing process was normal in spite of the localized subcutaneous infection.

Auricular or alar cartilage may be of good service in the correction of small nasal depressions. Costal cartilage is used by me as a rule (Fig. 6). Ivory,⁴ which I tried for a long period of years experimentally and clinically, has its indications as a nasal transplant, if the patient refuses to provide his own cartilage (Fig. 7). A syphilitic deformity should no longer exist, if early and intensive antiluetic treatment is applied. The characteristic appearance of a luetic nose is due to a more or less extensive necrosis of the nasal bones, with great loss of the mucous membrane lining. In these cases, the skin cannot be sufficiently undermined for the introduction of the transplant, because of the adherence of the cicatricial mucous membrane in the region of the apertura pyriformis. The correction of this type

of deformity, made simply by the introduction of a cartilaginous transplant, will not be satisfactory, as it is incomplete and the luetic appearance of the nose remains unchanged.

The epithelization of the nasal cavity by a Thiersh graft, introduced by means of a moulded piece of stent, presents the first stage of the correction. The cartilaginous graft is introduced some months later.

This method, the only one that overcomes the luetic aspect of the nose, gives perfect results, but requires much time from the patient and the surgeon. This procedure, which was brought out by Gillies⁶ in applying the principles of Esser's epithelial inlay, may be also used with success in the treatment of stenosis of the nose, ectropions of



Fig. 7.

Mr. J. F. Congenital saddle nose, corrected by an ivory transplant, introduced through the eyebrow. The patient refused to provide his own cartilage.

the eyelids and lips, and deepening of the gingivolabial cul de sac (Fig. 9).

For the correction of a luetic nasal disfigurement with partial or total loss of the organ, the same methods are applied as during the war for extensive nasal injuries. The difficulties, however, are increased in lues because of endarteritis and the low vitality of the tissue.⁶ The lining was the key to the success of rhinoplastic efforts during the war. All failures of pioneers in nasal reconstructive surgery, which could not be overcome during many centuries, and at the beginning of the war, have been due to the omission of the nasal

lining. Even last year during our visit to Paris we saw some old cases of total rhinoplasty made at the beginning of the world war by the old method, which did not provide sufficiently for the nasal lining. All of these newly rebuilt noses have been completely obstructed and have lost their shape. The nasal lining has to be provided from the skin around the defect or by an epithelial inlay, as explained above.

Hare-lip: Its operative technic is well known and described in all classical treatises. I would say some words only in regard to late postoperative results. Even after operations by the most skillful surgeons, we still often see a deep notch of the lip, with flatness of the latter.

It is also necessary to mention the hare-lip nose, characterized by flatness and lowering of the corresponding nostril. The notch of the



Fig. 9.

O. McA., age 4 years. Dentigerous cyst of the left antrum with necrosis of the walls. Retraction of the upper lip, due to the bony defect and scar formation, after removal of tumor, was released by excision of the scars and Thiersch grafting of the cul-de-sac.

lip, which is particularly conspicuous, may be corrected by dissecting off a triangular mucous membrane flap taken from the posterior surface of the lip and suturing it in a lower position (Fig. 10). The flattening of the nostril is corrected by excision of a thromboidal fragment of vestibular skin, and suturing of the nostril near the columella. Pronounced flattening of the upper lip is often observed in a repaired hare-lip. It can be corrected, when a denture is worn, by deepening the gingivolabial sulcus in which the gum of the denture is placed, making thus the lip to protrude.

Paraffin Transplant: Paraffin was used for the first time in facial reconstruction in about 1890, by Corning, of New York, and later by

Gersuny, of Vienna. Its use at that time was much in vogue and it was employed especially for cosmetic purposes on the face and chest, as well as in rhinology, to narrow the nasal fossae in ozena. However, one soon found, that along with the immediate success, one also encountered numerous accidents and frequent failures, due to



Fig. 10.

Miss S., age 20. a. Sequel of a hare-lip operation performed in early childhood. This patient, whose father is a physician, was not advised to undergo a secondary plastic repair because of a possible "curling of the lip." b. Result after operation by sliding a triangular mucous membrane flap and tattooing the overlapping skin fragment.

peculiarities of the paraffin and susceptibility of the patient. There were frequent reports of emboli especially, of the central artery of the retina, chronic inflammatory reaction and diffusion of the injected paraffin in the surrounding tissues. These were due to the use of liquid paraffin with a melting point of about 100° F. Solid paraffin,

with a melting point of about 140° F., although prized at the beginning, as being safe, turned out to be dangerous by its late complications, namely, the formation of tumors, called paraffinomas. Anyone who has seen a case of this kind, I am sure, would dismiss the use of paraffin in reconstructive work. Applied for the correction of depressed noses or cheeks, paraffin may give good results in certain cases, but in the course of time, varying from three to ten years, the paraffin may be displaced and infiltrate the subcutaneous tissues and the skin. A hyperplasia of connective tissue is formed around the injected mass, which undergoes a complete transformation^{8,9}.



Fig. 12.

Miss D., age 45 years. Facial lifting and removal of wrinkles around the eyes. Picture taken four days after operation. Professional indication as patient was in danger to lose her occupation as school teacher, for being "too old."

One finds hard, painless masses infiltrating the skin, subcutaneous tissue and mucous membrane of the mouth. The skin is shiny and sensitive to changes in temperature. The contour and expression of the face changes and becomes very conspicuous.

Microscopically, it is composed of cellular elements, surrounded by inflammatory tissue. The paraffinoma does not necessarily follow the injection of paraffin. This tumor needs for its development a predisposing soil, which it is impossible to recognize in advance.

(Follow demonstration of two paraffinoma cases, the report of which will be published separately.)

Ear Deformities: Among ear deformities, the most common are protruding ears. Their correction is brought about by the excision of cartilage and skin, usually from the concha with the removal of the resulting folds on the anterior surface of the ear. Other deformities, which require correction are hypertrophy of the ears (macrotia), abnormally-shaped ears, synechia and postauricular fistulae after mastoidectomy. The correction of the total absence of the ear is the most difficult task, because of the irregularity of the organ.

Skin Deformities: These are a source of keen distress to thousands of women. Everything goes the way to death by a progressive decline, but for one who dies of old age, a hundred die of accident or disease. If we cannot avoid death, at least we can retard it by preventing accidents and infections which hasten it. These generalities apply to the life of the skin, especially of the facial skin, the latter being exposed and less protected than the rest of the body. Very cold or hot air, wind or rain are harmful, and if we add to this the influence of cosmetics used by women from their girlhood, we will have the causes of a prematurely injured skin, which is creased and flabby. A personal predisposition plays also an important role. Professional and social reasons make these patients require help. The so-called facial lifting is indicated especially for women prematurely aged, with a very flaccid and a drooping skin. The excision of the skin should always be done in the periauricular region, largely hidden by the hair.

A wide undermining of the skin is necessary. The insertion of subcutaneous fascia loops is indicated to efface the folds. The results obtained in these patients is often amazing, and their mental and professional status is thereby greatly improved (Fig. 12).

CONCLUSIONS

1. The field of facial reconstructive surgery is growing rapidly, as its value becomes evident to the medical and public opinion.
2. Prophylactic measures in this field will avoid unnecessary deformities.
3. As a rule, nasal deformities have to be corrected by the endo-nasal route.
4. Skin, cartilage and fat are the best transplants to be used in facial reconstruction.

5. Paraffin is to be condemned, as all other inorganic substances. Ivory, as a dead organic substance similar in structure to bone, has its indication, as a substitute in some instances.

6. Aged and flabby facial skin can be surgically corrected in women for professional and social reasons.

7. A thorough rhinological and general surgical training, together with some artistic inclinations, are necessary requirements for this work.

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258 Riverside Drive.

EAR, NOSE AND THROAT FINDINGS OF 9,751
FRESHMEN STUDENTS, UNIVERSITY
OF PENNSYLVANIA.*

DR. PHILIP S. STOUT, Philadelphia.

These examinations were part of the regular entrance examination of the physical development of the student as he enters college.

They were made by a number of examiners: Dr. R. Tait McKenzie, Dr. Charles Wharton, Dr. George Wilson, Dr. R. S. Boles, Dr. Hunter Scarlett, Dr. A. Light, Dr. Douglas Macfarlan, Dr. Temple Fay, Dr. J. H. Arnett and myself.

Permit me to call your attention to the fact that these examinations were made by at least ten different examiners during the last six years. This removes any possibility of bias which one examiner might have.

The examinations are conducted as follows:

A freshman is given a card which he fills out as far as he has been instructed and presents himself for examination in the gymnasium. After removing his clothing he is first weighed and measured and then he is sent in to the physician's examining room, where the whole examination is made by one of the above-mentioned doctors. Standing before a glass, his posture, spine, etc., are noted; then, reclining on a table, his heart and lungs are examined.

Then follows the examination we are interested in today, the nose, throat and ears. The student is brought over to a good light, or a flashlight is used, and his throat is examined for the condition of the tonsils or other pathological conditions that may exist in the mouth and throat, including the teeth. Then his nose is examined for external deformity, deflected septum, polyps, blocking of the nares, or anything that might interfere with breathing. If he gives a history of sinus disease it is noted. Following this his ears are examined for external appearance, cerumen, mastoid, and hearing, using a tuning fork for hearing, and an otoscope, if necessary.

Ideal Examination: The late war gave many of us an opportunity to assist in the examination of thousands of men. You may remember that a soldier started in the morning going from one examiner to the other until he was completely examined, vaccinated, finger-printed, etc., all in one seance. This, of course, is the very best way

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to conduct an examination of the whole body. One physician for each principal examination, such as: one examiner for posture, spine, contour, chest, external condition of the body, skin, limbs, and feet; another for the heart and lungs, abdomen and kidneys; and a third for the eyes, ears, nose and throat, neck and thyroid gland. We hope to have such a unit at the University of Pennsylvania in the near future.

MEDICAL AND PHYSICAL EXAMINATIONS AT THE UNIVERSITY OF PENNSYLVANIA.

NUMBER EXAMINED	1600	2079
FLAT FEET	22%	28%
DEFECTIVE HEARING	13 "	16 "
FLAT CHEST	24 "	15 "
DISEASED TONSILS	10 "	13 "
POOR POSTURE	10 "	12 "
CONSTIPATION	11 "	11 "
ROUND SHOULDERS	5 "	10 "
ENLARGED TONSILS	9 "	9 "
CURVATURE OF THE SPINE	7 "	9 "
LOW SHOULDERS (R. & L.)	11 "	9 "
OBSTRUCTED NOSTRIL	1 "	5 "
HEART CONDITION	5 "	5 "
DEFECTIVE VISION	6 "	4 "
	1924	1915

Chart 1.

Chart No. 1 shows some of the conditions noted in each examination. You will note that defective hearing ranks next to flat feet and flat chest in frequency. Diseased tonsils and hypertrophy tonsils make up about 20 per cent of the conditions noted.

It is necessary that we have some standards to go by in these examinations and at first it is a little awkward for an examiner, but after some practice it is rather remarkable with what speed and accuracy

examinations are made, not infallible, but almost always nearer right than wrong.

What do we call a normal tonsil?

What do we call a diseased tonsil?

The Normal Tonsil. The tonsils that are pale in color, small, even in outline, pillars free from congestion and not associated with attacks of tonsillitis or other constitutional diseases; we feel that we can call them normal or negative tonsils.

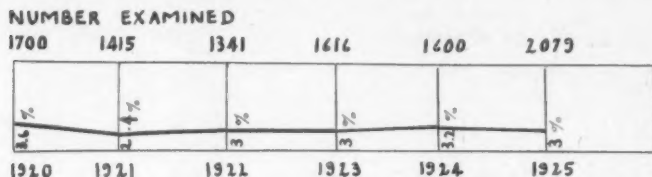


Chart 2. Negative or normal tonsils.

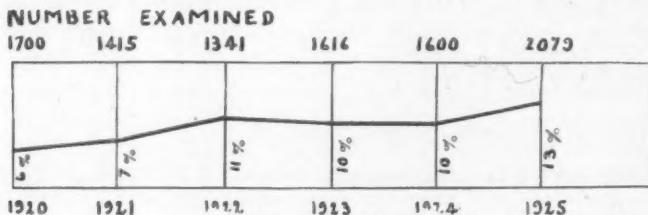


Chart 3. Diseased tonsils.

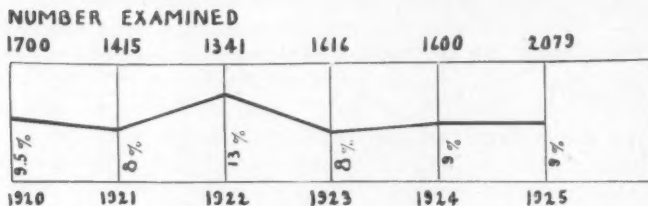


Chart 4. Hypertrophy of tonsils.

Chart No. 2. Notice that the normal or negative tonsils stand about 3 per cent.

Diseased Tonsils. Diseased tonsils are those that are manifestly diseased the moment we look at them; those that are not so bad-looking but have congested pillars; those that are buried, having congested pillars or coupled with a history of sore throat, pharyngitis, laryngitis, frequent colds, heart diseases, rheumatism, chorea, and

other conditions which are due to focal infection. Again, if we find enlarged glands in the neck, this makes us more apt to suspect either the tonsils, the teeth, or sinus disease, and we suggest that the student be re-examined.

Chart No. 3 shows number of diseased tonsils, up to 13 per cent in 1925.

Hypertrophied Tonsils. A certain number of tonsils appear to be simply enlarged without any other sign of pathology. These we class as hypertrophy.

NUMBER EXAMINED

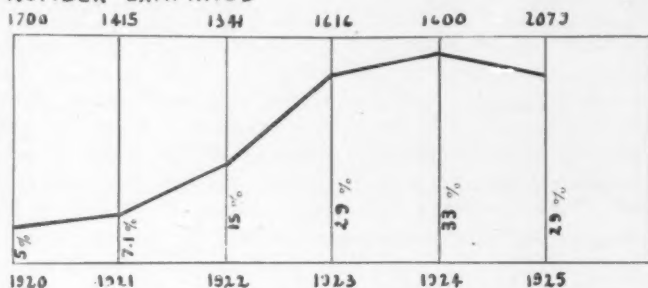


Chart 5. Tonsils excised before entering college.

NUMBER EXAMINED

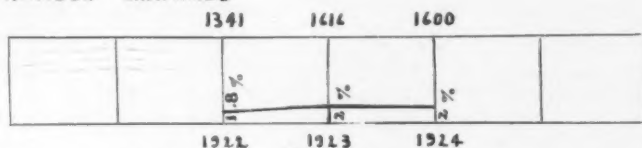


Chart 6. Tonsils reappearing after excision.

Chart No. 4. Hypertrophy of tonsils average about 9 per cent. Tonsils excised before coming to college.

Chart No. 5. You will notice that it rose from 5 per cent in 1920 to 33 per cent in 1924, dropped to 29 per cent in 1925, but there was a corresponding increase in the number of diseased tonsils in 1925.

Tonsils reappearing after excision.

Chart No. 6. For several years we noted carefully the recurrence of tonsils after removal. The average was about 2 per cent.

Uvula. Elongated uvulae are occasionally seen.

Nose. External deformity: From time to time we note students with external deformity of the nose which mars the appearance to such an extent that we suggest that they have correction made.

Deflected Septum and Blocking of the Nares. We ask the student if he has any difficulty in breathing through his nose, or if he has been told that he snores when he sleeps. If he answers yes, we try to see in a general way if there is any gross obstruction by having him blow out first through one nostril and then through the other, closing the opposite nostril by pressing against the side of it with the finger. If we find obstruction we refer him for further examination.

Ears. Slight deafness is one of the most common defects of all

NUMBER EXAMINED

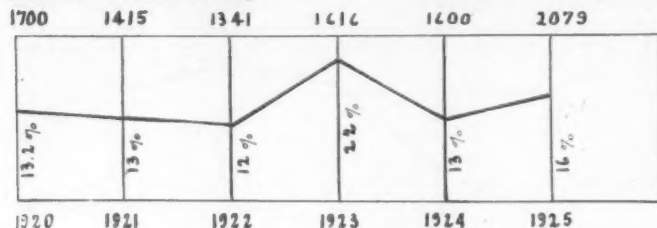


Chart 7. Defective hearing.

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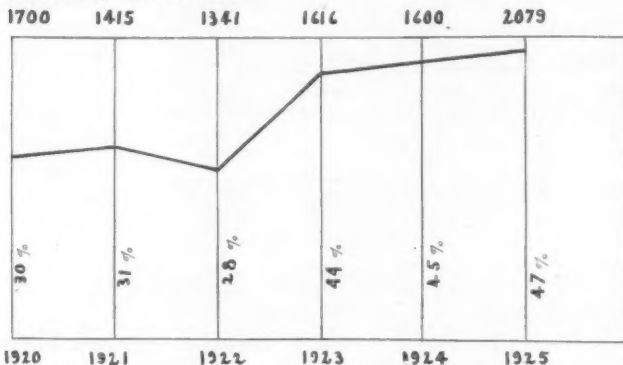


Chart 8. The above were advised to have additional examinations for nose, throat and ear conditions.

students. This may be caused by a great many things: 1. cerumen; 2. nonsuppurative otitis media; 3. suppurative otitis media; 4. otosclerosis; 5. cholesteatoma; 6. polyps in external canal.

The amount of hearing is still the bugbear and we are installing an audiometer to examine groups at one time. This will give us a more accurate determination of the actual hearing. At present we use a

medium fork with knee blow and with a little practice one can get a fair, but not very accurate, measurement of the amount of hearing. The otoscope is always handy for examination of the drumheads and the amount of cerumen.

Chart No. 7. Defective Hearing.

Cerumen: 10 per cent of the freshmen have the external canal blocked with cerumen. This frequently lessens the acuity of hearing.

Mastoid. Latent mastoiditis is found each year. This is extremely important and we are happy that we have saved a number of students' lives by giving them the proper warning.

Permit me to give one example of the value of such warning: A student from Washington, D. C., was warned at the time of his examination of a latent mastoid condition associated with discharge of the middle ear. Some months later he was taken with a severe pain in that ear. He immediately sought medical aid, was operated upon by Dr. E. B. Gleason within forty-eight hours of the onset of the attack, with recovery, although the infection had extended to the dura. A number of such examples might be given.

It is interesting to note the vast number who have some nose, throat or ear defects on entering college.

Chart No. 8. The student is advised as to his condition and requested to see his own physician for confirmation of findings and treatment. If he comes from a distance he is given an opportunity to have another confirmatory examination and recommendation of treatment without charge. We do not, however, encourage free treatments unless the student is unable to pay.

In a subsequent paper we will bring out the improvement noted in the students during their stay in college. It would extend this paper beyond the time limit to go into that now.

A resumé such as this calls attention to the conditions now existing. Notwithstanding the large amount of work done in schools there is still a vast amount of corrective work remaining to be done even in picked men, such as now enter college. (This is also true of women.)

I desire to express my appreciation of all the above-mentioned physicians and especially of Dr. R. Tait McKenzie, Dr. Charles Wharton, and Dr. E. B. Gleason.

Medical Arts Building.

AN IMPROVED METHOD FOR TESTING THE HEARING WITH THE SPOKEN VOICE.*

DR. DAVID NUSSBAUM, Philadelphia.

The testing of the hearing capacity of the ear by the living speech is just as important as that by musical instruments (tuning forks, Galton whistle, monochord, watch, etc.); in fact, it surpasses it in many respects, for the reason that nothing equals the human voice in its ability to produce sound complexes of such varied qualities.

Furthermore, it not seldom happens that the perception for musical tones may yet be present, while that for the spoken language is entirely absent, or vice versa; and individually, they seldom keep the same pace in their progress towards improvement, so that the hearing distance for speech may have reached almost normal limits, while the perception of musical tones is still lagging behind.

It is therefore inexpedient to draw conclusions from one concerning the other and it becomes obvious that the human voice is an indispensable means for testing the hearing ability for ordinary speech.

After all, the perception and understanding of the spoken word is what concerns us most; because more often than not, the average patient is seeking medical help not on account of diminished perception for musical tones, but when he or she are sensing difficulty in understanding the ordinary conversation, necessary in their everyday life.

Testing with living speech gives us the additional advantage of obtaining quick and comprehensive information, first about the hearing capacity as a whole, and, second about the particular seat of the disease. The latter is based on the physiological difference in the perception of high and low sounds.

There are, of course, many limitations to the use of the voice as the sole testing method, as for instance, in deaf mutes where the smallest hearing remnant gains significance; in high grade hearing impairment, or in complete uni or bilateral deafness, where we wish to ascertain the impairment of the entire tone scale.

In such and in other cases, whenever there is a marked disproportion between the objective otoscopic findings and the degree of impairment for hearing the spoken word, we must resort to clinical instruments for the sake of corroboration or correction.

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Otologists are agreed upon the use of the whispered voice, when testing with the spoken language, for the following reasons:

1. The ordinary loud conversation cannot be regulated in respect to its timbre, pitch and carrying power as well as the whispered words. The louder we talk, the less will hard-hearing people understand us, because, by increasing the intensity of the vowels we drown out the consonants. The whispered voice enables us to use a level pitch in making the test.

2. The space available in our offices and clinical rooms—from 18 to 30 feet—is entirely too small. The loud voice is perceived at a much farther distance, even in the presence of slight or moderate diminution of hearing.

3. At close range there is no way of preventing the loud voice from being heard by the healthy, untested ear, even when both ears are tightly closed. Therefore, in beginning unilateral deafness an accurate hearing test cannot be made with the ordinary loud conversation.

According to Bezold's suggestion only the residual air (that is, the quantity left in the lungs after an ordinary, but not enforced, expiration) is to be used for whispering. But even this proves, at times, too loud, when dealing with a slightly impaired hearing, so that we must lower the whisper still further.

However, with a little effort, the examiner will soon learn to handle *his* whispered voice at approximately the same pitch, at all times. He must also find out at what distance the average normal ear will perceive *his* whisper and so establish for *himself* a dependable comparison standard for testing the hearing capacity of the ear and for controlling clinical and therapeutic progress.

A very important—and by far the most reliable—factor in correct testing with the whisper is to know the exact quality of our testing words.

Since we gauge the degree of an existing deafness by the distance a person is still able to perceive an ordinary conversation, it is of utmost importance to select our testing words in strict accordance with this principle in view. Because our spoken language is a complex of words whose hearing distance is not uniform, but rather varying in conformity with the hearing distance of their individual component sounds.

Vowels possess a high tone intensity and are therefore heard at a greater distance (224-228 m.) than the consonants with their lesser intensity (10-160 m.); for this reason the consonants are the determining factor in the understanding of words and are consequently possessed of a higher testing value than the vowels.

It is also important to know that each sound has its individual hearing distance and occupies—similar to musical tones—a distinct zone in the tone scale, corresponding to the number of its vibrations (pitch).

The highest vowels and consonants are “i and s” and the lowest “u and r” respectively.

O. Wolf, in 1871, was the first investigator to substitute, for musical tones, vocal sounds of corresponding pitch; to establish their hearing distance and to combine them in such a manner as to be able to differentiate between middle and inner ear diseases.

He made use of two-syllable words, arranged in three groups, namely: high, medium and low, according to the prominence given therein, to at least one of the testing sounds.

He then tried to find out how easy, or how difficult these words were perceived by the patient, as compared with a normal hearing individual and drew therefrom his conclusions as to the nature and seat of the disease; this was his qualitative test.

By the same procedure, in comparing the hearing distance of the normal individual with that of his deaf-growing patient he measured the degree of hearing lesion; this constituted the quantitative test.

Wolf based his word system on the following principles:

1. By the continuous use of the same consonant he sought to prevent its substitution with others.
2. By varying as little as possible the tone color (quality) of the test word, he endeavored to give it stability and increased testing value.
3. By the use of very few testing words, he tried to help the examiner to memorize them.

Unfortunately, this scheme of words defeats its own purpose and fails completely when applied in practice, for obvious reasons.

The understanding of any word depends primarily on the consonants, due to their lesser tone intensity, and it resolves itself ultimately to the perception of a single consonant, the key, so to say.

It is the perception of this particular, basic consonant that constitutes the main objective of our testing.

Now, if we repeat steadily the same word, the patient need not perceive the key consonant. He is capable, with a little intelligence, to reconstruct in his mind the entire word if he only catches one or two other consonants.

He is replacing in this fashion, by mere guesswork, the very same testing sound, in whose perception we are so keenly and vitally interested. By the continuous use of the same few selected testing

words, the patient will, very soon, in the course of successive controlling tests, know them by heart, and will labor under the honest illusion of perceiving something, that he is in reality only guessing.

A new step in the development of the voice as a testing medium was made by Bezold by the use of numbers instead of words. He reasoned, that if all testing words should have the same meaning, they would be readily understood and therefore easily perceived by the average person, and it would be an easy task to obviate and eliminate guessing. In consequence thereof he pays little attention to the acoustic impression of the testing word, but is rather concerned with its concept or meaning.

By reason of this, he had to select from the entire language treasury numerals only and for practical purposes limit himself to a few monosyllables, like "four, five, nine" and two polysyllables, like "seven nad hundred."

This system is as defective as that of Wolf's for almost similar reasons: 1. Few words. 2. Same content, *i.e.*, numerals.

So long as the patients know what they are expected to hear all they need do, is to perceive one consonant and they will quickly reconstruct the remainder of the word, *i.e.*, number. This in itself defeats the purpose of the test, which is intended by its author to elicit the perception of the whole word and not that of a single sound, as does happen in reality.

The patient knows of only two numbers beginning with "s," of two starting with "f" and one with the initial "n;" it suffices for him to perceive the first consonant to readily guess the rest, because the selection of alternative words is tightly drawn.

Furthermore, it will easily tempt the patient to concentrate primarily on the meaning of the test word, which is of necessity a number, and relegate the acoustic impression thereof, which alone has any import for us, to a negligible place.

The use of numerals as a testing medium is highly inadvisable, for the reasons mentioned.

A renewed attempt to adhere strictly to the acoustic features of the testing word was made by a number of Dutch investigators and their scheme adapted by Italian, Japanese and German otologists to their respective languages.

The system consists of a number of words, in which all the component sounds—vowels as well as consonants—have the same pitch (tone height) and the same loudness (intensity), so that the resulting word belongs in its entirety to one tone region, and assumes therefore a distinct, characteristic acoustic ring, which is difficult to confuse or be guessed at. The average hearing distance for the normal indi-

vidual was empirically established and used as a standard measure in diminished hearing.

Reuter, a German investigator, went even further in his determination to uphold the acoustic uniformity of the individual word, by limiting them to monosyllables alone, and to corroborate his findings he applied an additional test with the key sound of each word, only.

But soon all of them faced the same difficulty of finding in their respective language enough words to conform to their requirement, and were forced to take refuge to words constructed of a conglomeration of acoustically uniform sounds, rigged together, without the slightest concern as to what word monstrosity they created thereby.

The pivotal principle, the mentioned system is hinging upon, is the uniform acoustic color (quality or ring) of the individual word as a whole, with its well defined, characteristic test value, but devoid of any meaning, whenever the latter had to be sacrificed to the principle of acoustic unity; the exact opposite of the numeral system, where meaning is paramount, but no consideration given the acoustic picture.

This explains their failure in practical application and their inherent defect from the scientific standpoint.

Barany sought to avoid these pitfalls by introducing the idea of the "changeable sound," that means, testing the hearing with a scheme of words wherein *all* the constituent sounds but *one*, which is steadily changing, are of uniform acoustic quality. It is upon this sound that the undivided attention of the listener is concentrated.

The selection of *one sound* as the deciding element in the perception of a test word is of great practical value, because the outstanding vowel or consonant is reaching the ear with higher intensity, and unfolds its tone quality with more clearness and purity than the full word does. Furthermore, the individual sound is the basic element of the words that go to make up our spoken language, and the unhampered understanding of the latter is entirely dependent upon the correct perception of the former.

Basing on the principle that the distinct acoustic value of any word revolves ultimately around a single sound, of known pitch, he constructed a synthetic table of words, each and every one readily understood by the average person.

These words have the same distinctive acoustic ring in the patient's ear, but differ from one another by a single sound, of known pitch and hearing distance, and it is this very sound that determines their correct perception and accurate understanding.

His table consists of twenty-four rows, each containing from four to twelve words, but hardly one-third conform to his rule of absolute acoustic equality of all, but the *one* changeable sound. Some of them

have no meaning and are embarrassing to the patient who is loath to repeat a senseless word, and to others he suddenly attaches a strange suffix, burdening his patient with an unexpected obstacle, which detracts his tense attention from the key sound and thus hampers the facile perception of the test word.

With all these shortcomings, Barany's "changing sound" method is today the most perfect instrument for voice testing, because it combines the use of living speech with the principle of pure air conduction.

Lampert endeavored to strengthen the weak points of Barany's structure by the careful arrangement of a new scheme of words, based on a two-fold principle, namely: 1. Each and every word must have an understandable notion for any individual of average intelligence; and 2. all the constituent sounds, which he calls the "parallels," must have a strict uniform pronunciation, excepting the key or testing sound.

The words are arranged in two main divisions, consonant and vowel, according to their initial sound and then grouped in rows of three to ten words each. The beginning and ending of each row is represented by sounds at both extremes of the tone scale, *i.e.*, high and low—only if a proper word cannot be found then the adjoining tone area is tapped—while the middle contains representatives of the intermediary tone region. The acoustic picture obtained in this way gives an adequate and quite accurate idea of the existing perception for high, low and intermediary tone sections. It is not necessary to test every sound of the scale, because it has proven quite satisfactory for our purpose, to know the exact condition of the highest and lowest hearing zone, only when the course of the disease is to be followed up do we test for sounds representing adjoining hearing sections.

Lampert starts the testing with the consonant row first, on account of their lesser intensity and high acoustic value and records the farthest distance the patient is still able to hear and repeat accurately the test word, and expresses in this way their intensity or loudness.

So far, there is no established "normal" standard for measuring the sound intensity, and opinions vary as to what is the hearing distance of a healthy ear; we must, therefore, register the distance at which the word is still heard and regard this as a fair appraisal of the existing hearing power.

It should be emphasized that all known precautions, like the use of the whispered voice reduced to approximately the same pitch level, the possible absolute elimination of the untested ear, the turning away from the patient, etc., must be exercised, in order to safeguard against unavoidable technical errors.

His foremost concern is the patient's perception ability for the key sound upon which the understanding of the entire word depends. In order to reduce guessing to a minimum he transmutes this very sound from the beginning, to the middle, and to the end of the test word, alternately; when it becomes necessary to repeat a row, he rather starts with a new one.

The low sounds range from C-d² (64-576 d. v.) and are represented by the vowels u and o and the consonants r, m, n, w and h; the high sounds range from d²-fis⁴ (576-2880 d. v.) and comprise the vowels a, e, ei, and i, and the consonants s, l, f and g, in addition to the explosive sounds of middle height b (p), k, t (d).

I. CONSONANT ROW.

a. The interchangeable key sound is the initial.

1. sat	2. sell	3. sill	4. sap	5. set	6. sin	7. sore	8. sun
bat	shell	fill	gap	get	shin	shore	shun
pat	fell	bill	cap	bet	fin	fore	gun
fat	bell	pill	tap	pet	bin	bore	fun
mat	tell	kill	map	met	pin	core	bun
rat	well	till	nap	net	kin	more	nun
		dill	rap	wet	tin	wore	run
		will			din	tore	
		mill					
		nil					

b. Interchangeable key sound in the middle.

1. water	2. coffer	3. rubber
warmer	copper	rudder
warner	cotter	runner
	comer	
	cover	

c. Interchangeable key sound in the terminal.

1. sale	2. mass	3. rush	4. fish	5. rose	6. hush
safe	mash	rug	fill	role	hug
save	map	ruf	fig	rove	hub
sake	mat	rub	fib	robe	hut
same	mad	rut	fit	rope	hum
sane		rum	fin	rode	hun
		run		wrote	
				Rome	
				Rhone	

II. VOWEL ROW.

a. Vowel as initial.

1. ann	2. at	3. all	4. axe
inn	ft	eel	aches
on	eat	ill	ox
own		owl	

b. Vowel in middle.

1. fall	2. pail	3. wall	4. tall	5. sat
fell	pell	well	tall	set
fill	pill	will	tell	sit
file	pile	well	till	sle
full	pawn	wool	tile	soot
fail	pull		tool	
foul	pale			

c. Vowel as terminal.

1. ma	2. saw	3. tea	4. hah
me	see	tie	he
may	say	too	hoe
my	sow	toe	hay
mow	so		how
			who

RECAPITULATION.

The living speech is not accorded the consideration due to its importance for testing the hearing; the most popular textbooks dispose of it with a few remarks.

This may be due to inherent defects in the methods used, as well as to the arrangement of the test words, which are either few in number but possess a meaning, or senseless, unintelligible and awkward to repeat, and last, but not the least, the very underlying principle of the various testing methods is controversial matter in our own day.

Some writers base their system on the content of the word to the detriment of the acoustic aspect (Bezold), while others disregard completely the meaning and stress the acoustic unity.

Both failed in practice, the first on account of using very few numerals, which the patient soon learns to guess, and the second for using unintelligible words, which the listener is hesitating to repeat for fear of appearing ridiculous.

Barany tried to concentrate the patient's tense attention on the *one* sound which controls the perception of words and by a continuous change of this keynote sound, he constructed, as much as possible, a series of readily understandable words, easily repeated by the examined. He thus tried to prevent guessing and the construction of new words by the confused listener.

He did not succeed, because he failed to adhere strictly to the rule of giving his words a uniform acoustic entity.

This was done by Lampert, through his method of "interchangeable sounds," by creating a system of words, where *all* sounds, called "parallels" are strictly of the same pitch, timbre and carrying power—a uniform acoustic structure—while the *one* that effects the perception is alternately transmuted from one end of the word to the other.

The test words are part and parcel of the average person's vocabulary, therefore readily perceived, understood and repeated.

1024 Spruce Street.

"HEARING" BY TOUCH; DEMONSTRATION OF A CASE.*

PROF. ROBERT H. GAULT, Northampton, Mass.

Undoubtedly there are many in the audience who have not yet had a good opportunity to be acquainted, to any degree of detail, with the work I am doing. Before I go on, therefore, to demonstrate a case permit me to review the enterprise so far as it has proceeded and to set the whole work in the proper perspective.

During the past four years—more especially during the last two—I have been working upon a method whereby fingers are made to substitute for ears; a method by which a speaker's vocal vibrations are instrumentally communicated to the fingers or palm of a subject in such manner that the words spoken can be felt by a considerable group of persons simultaneously—whether they are near to the speaker or far away from him and out of his sight completely. But I have sought not only to have the words felt; the subject must be able to notice distinctions amongst words as felt so that he may learn ultimately to associate feels with meanings and to understand speech through the medium of touch impressions.

In the next place I have been developing a method whereby the feel of words and their elements may be used to aid the mute in getting control of his vocal expression. The mute is as he is in respect to speech because he cannot hear even his own voice. He is therefore unable to make correction of his speech. But when he can *feel* his own voice and mine in succession upon the same word he shortly has some cues to guide him in the act of speech.

This is a broad, fundamental psychological problem. More accurately it lies upon the borders of three sciences: Psychology, Physiology and Physics. Like every other fundamental problem it radiates in many directions. It runs into numerous psychological problems of a very technical nature: the problem of meaning, for example. It takes off into the science of phonetics and it offers a most unique and valuable starting point for the scientific study of the genesis of a language from its very beginning. Here is a handle that men of science in future will make much of: those who are interested in the development of language.

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What I have said will, I hope, set my own work in the proper perspective. The fundamental problem runs into the practical ones that I have already mentioned relating to the deaf: enabling them to receive and interpret speech and to control their own vocal expression. These ends cannot be attained by one leap from the seafoam. Our technique cannot be made perfect at a stroke. It must be preceded by a great deal of patient investigation into the backgrounds.

For those of you who are not already well acquainted with the enterprise I want to mention the high lights among our accomplishments so far.

Last May two of our subjects attained the capacity to interpret a story couched in colloquial English when they had nothing to go by but its feel communicated through the receiver of our apparatus to the fingers of the subject. In two years they had an aggregate of 290 and 280 hours of training in the laboratory. Others of our group picked up words and isolated sentences but failed to report the stories as connected discourse.

This accomplishment was preceded in the course of two years by a great deal of drill upon a large variety of exercises.

There have been many by-products of all the work leading up to the accomplishment I have mentioned: by-products that, for the most part, were unforeseen at the outset.

Our subjects have acquired a familiarity with the movement of speech that they never had before: they know its accent, emphasis, rhythm and tempo. These are qualities that can hardly if at all be got by practice in reading lips. As a consequence these people enjoy speech as they could not otherwise. They have been shot through with a language sense as you and I have been; only we have acquired it through the medium of our ears—they through their fingers. It is highly probable that they are well on the way toward feeling the lilt of speech that you and I experience. They are acquiring the same motor or kinesthetic associations with language that we have made.

All this is reflecting itself in our subjects' silent reading. They could in May mark a page in an unfamiliar book to indicate fairly well how a good reader would read it. In this respect they were 28 per cent superior to subjects of corresponding age and school experience but who had never been within our laboratory till they were brought there on a certain day to undergo a test upon this point.

It is a fair hypothesis that familiarity with the movement of speech, however our people may acquire it, will make them the better unaided lip-readers in future. It will require a long time and patient work to test this hypothesis. But there is good psychology to sup-

port it, and certain experiences that you and I have in silent reading support it also. But these are technical points into which I shall not enter now. It has encouraged me to find that some competent teachers of the deaf support the view I have taken.

What I have just now been saying will prepare you for my assertion that our cases enjoy verses as they are felt and that they have their preferences amongst verses. Laboratory tests confirm the assertion. But their preference is not always confined to a certain rhythm of verse. Of two verses in the same rhythm, one containing predominantly the long or broad vowel and diphthongal qualities and the other the short qualities, the former is almost consistently preferred.

This observation has led me into preliminary experiments upon the reception and enjoyment of music. The results have been sufficiently promising to induce me to follow the investigation further.

But the result that suggests immediate practical value of large scope, I have yet to mention.

Let our subjects simultaneously see my face and feel my words whilst I speak: they can interpret my speech from 30 per cent to more than 100 per cent better than they can by observing my face alone. This has been demonstrated in our laboratory five times. The last demonstration was made by a skeptic who became convinced.

A result of this nature is assured in advance by two considerations:

Homophenous words like "aim" and "ape" that cannot be distinguished by the lip-reader can be discriminated by their feel with but few exceptions at most. There are upwards of 2000 such words in the English language.

In the second place one can feel the movement of speech much more distinctly than one can see it and this movement contributes toward the understanding of speech.

The superiority of lip-touch-reading over lip-reading gives assurance of a means whereby we may greatly speed up instruction in the schools and at the same time, I believe, enhance the pupil's ability to read lips without instrumental aid when he is outside the school and after school days are over.

Having reported this very brief summary of what has been accomplished I shall show a few slides to illustrate our method and to afford a graphic representation of certain results.

SUBJECTS AND HOURS.

The subjects or cases who have served in these experiments are deaf college students, age 17 to 28 years. For the most part they are congenitally deaf or became deaf in very early life before much

language had developed. They range from freshman to senior in college. Three of them have long since left school and one of these is an instructor in Gallaudet College. The young woman who is here this evening is congenitally deaf. The audiometric test gives a zero result for each ear.

Within the year that closed last June we worked with eighteen cases that fall within the age group I have mentioned and four 7-year-olds who were having their first school experience.



Showing how the receiver is held with the thumb upon the diaphragm.



A group of cases at work.

Of the eighteen there were ten who began their laboratory work about February 1. Their aggregate number of hours spent in laboratory drill up to June ranged from 25 to 58 hours. The aggregate is made up of two 40-minute periods, daily for five days a week.

As to the remaining eight, their periods of drill aggregate from 110 hours to 290 hours. The young woman here this evening has aggregated 110 hours. She first came into my laboratory on Oct. 16, 1925. All the others, aggregating up to 290 hours, have been in the laboratory since Oct. 8, 1924. Two of them, whose aggregates are

280 and 290 hours, respectively, were able in May to report a story, though they had no criteria to guide them but the feel of successive words and sentences upon their fingers. In other respects they are correspondingly proficient. Naturally I wished to bring one of them here to demonstrate this evening. Last June she agreed to come and was most enthusiastic over the prospect. Unfortunately at the eleventh hour she sent me word that she cannot be here on account of the very serious illness of her mother. I cast about in turn for three others. Two of them I could not locate and the third had just taken a position from which she could not be released to make the journey to Colorado. I then wired Miss Dorothy Clark and received her acceptance but fifteen minutes before I left Washington. And here she is.

Miss Clark is congenitally deaf. The audiometer makes her zero in each ear. She is a junior in a Western college. Before she went to college she was for twelve years a pupil in the State School in Colorado Springs. Of her 110 laboratory hours, 73 were before Jan. 1, 1926, and 37 since that date. Her college schedule made it impossible for her to be more than an intermittent attendant since Jan. 1. For these reasons it is evident to you that I am not showing you tonight my "star pupil." Miss Clark has done extraordinarily well in the time she has spent in our laboratory, but her aggregate time has been but little more than one-third of the time several other subjects have given to the work.

You must bear it in mind that what you see her do tonight is done at the end of a long summer's vacation of no practice during which she has had an unparalleled opportunity to forget. Since she arrived here the other day we have given her but three periods of drill aggregating about one hour.

(In the demonstration that followed Miss Clark first recognized three out of ten vowel and diphthongal qualities by their tactual characters alone; in the second attempt she recognized only three out of ten. She was plainly confused by the unusual situation. In the third trial she identified eight out of ten. The ten qualities were a, e, i, o, u, oi, ou, er (middle western), oo, aw.

In the next place she attempted to recognize colloquial sentences, each one of which might have been any one of twenty. In the first trial she recognized only three; in the second, seven; and in the third, nine out of ten; or six, fourteen and eighteen out of twenty.)

The instruments we have been using in these experiments have been lent to me by the Bell Telephone Laboratory in New York City. And that reminds me to say that we experimenters have no instru-

ments to sell and that we will not have them for sale. It is hardly necessary for me to say this to you physicians, but laymen sometimes appear to think that I am in the business (or will be) of making instruments to sell. I am an experimenter. Others must make the implements. I am, furthermore, in the position of the doctor who has discovered a specific. The ethics of the profession requires that he give his knowledge to the public.

Further speaking of instruments for our use in these experiments I am glad to say that the Bell Telephone Laboratory is continuing its co-operation in a very practical way and at considerable expense. I expect, in October, to be equipped with new receivers that will be probably five times as efficient as the one we are using tonight.

People have been asking me what I foresee as a consequence of the experiments we are conducting. I believe we may fairly anticipate the day when schools for the deaf will have a transmitter analogous to this one in every recitation room; that at every desk occupied by a deaf pupil (or upon the pupil's body) will be an improved receiver to be used at the desk or carried to the blackboard to be plugged in there. That communication from teacher to pupil will be greatly facilitated thereby and instruction will be speeded. All of this will be accomplished without taking the deaf away from the language as it is spoken by persons of normal equipment. A further consequence will be found in the facilitation of silent reading, the improvement of vocal expression and even in the reception of music.

But this is not the whole vision. It is not improbable that an apt learner, after two or three years of special instruction to the end of developing a language sense through the medium of touch plus vision may take his place in the regular public school and compete with others there successfully. This assumes only that the regular school will equip itself with the necessary apparatus.

Pierce Hall.

A RATIONAL TREATMENT OF CHRONIC PROGRESSIVE MIDDLE EAR DEAFNESS.*

DR. L. WESTON OAKS and DR. H. G. MERRILL, Provo, Utah.

As otologists, two great problems confront us in the care of the deaf. First, we must discover rational and more successful means of dealing with loss of hearing; and, second, it is our responsibility to educate the laymen, that they may distinguish between scientific medicine and "sales psychology."

Believing that even discussion of such a question helps to organize and clarify observations made upon it, we are venturing to offer this brief preliminary report upon a method we have used, with some measure of success, during the past five years. The procedure under discussion harks back to a time in the hoary past, when someone ingeniously decided that to open the Eustachian tube offered the proper approach in treating some deaf patients. In other words, it is simply a revival of systematic dilatation of the chronically closed tube, to the point where it will again function in equalizing pressure upon the two sides of the tympanic membrane. That such reconstructive work is important, we believe is demonstrated in our results; but it certainly is not self-sufficient, and must be accompanied by other measures of whatever nature the individual case seems to require.

In using this method, two factors are worthy of mention as being responsible, when one fails to benefit the patient's hearing. The first and most important is lack of perseverance, upon the part of the patient or otologist. One must keep in mind that all of these individuals have had the cause of their trouble, in operation, for a long time, even though they have shown loss of hearing for only a comparatively short period. Such being the case, treatment must naturally be prolonged, if it succeeds. One or two of our colleagues have attempted to follow the procedure under consideration, only to cast it aside when a few weeks did not show decided results. Several of our deaf patients have been under active treatment for as long as two years; and improvement during the later months of manipulation was decidedly definite. The second essential factor is the proper selection of cases. At first glance, this would seem to be of more importance than long continuation of treatment. However, experi-

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ence has shown us that even types other than true conduction deafness may often be benefited in some particular.

Determining the type of difficulty is of great importance in prognosis: for we must be able to give the patient an approximate idea of the degree of benefit he may receive. Otherwise we are doomed to embarrassment and our reputation for veracity is certain to be assailed. In this, as well as in the follow-up of the case, during treatment, an instrument of precision for the measurement of hearing acuity is indispensable. Without such equipment accurate determination of type and degree of deafness is impossible. In addition, any other means of demonstrating that our patient has benefited by the treatment is so scientifically undependable as to at once class us with the cultist whose success hinges upon inducing a temporary state of euphoria in the mind of his victim. Personally, we are partial to the Audio-amplifier; but the later models of audiometer are also highly acceptable.

It seems pedantic to state that each deaf patient should receive a careful study before being accepted for treatment, or discarded as insusceptible of results. However, this is of such importance as to bear repeated emphasis. Briefly, we should include: some information as to the patient's general health; a detailed inspection of the nose, throat and accessory sinuses; nasopharyngoscopic study of the epipharynx, together with passage of one or more Eustachian bougies to determine patency of the tubes (the Politzer test may be used here, but the other procedure gives more dependable information); careful attention to tympanic membranes and ossicles, as to their free mobility, ankylosis, or fixation from other causes. Following these should come a detailed audiometric charting of hearing ranges, together with measurement of bone conduction and determination of degree of hearing for the amplified whisper. Simple turning to right and left will give a fair idea as to the gross condition of vestibular function.

In our experience certain factors have appeared that seem worthy of mention, in connection with the selection of cases for therapy. Obviously, one can do little for that deafness resulting from primary destruction of auditory nerve fibres. Those people who present a definite family history of otosclerosis had best be avoided, unless examination makes evident a decided conduction factor that the surgeon feels he can help, thereby reducing the patient's difficulty to some extent. Individuals whose audiometric curves fall below 50 per cent hearing for the 512 d. v. and 1024 d. v. tones will probably not receive much benefit, as a rule. Tubal dilatation would, of course, be

useless where examination demonstrates widely open tubes. One must also be decidedly guarded in one's prognosis, where the patient's attitude of mind is pessimistic and defiant as to what can be done for him. Failure is not improbable in such a case.

Certain preliminary measures, imperative in any treatment for deafness, are worthy of mention. Proper removal of tonsils and adenoids is essential. We have been led into error by innocent-appearing tonsils; and it is our firm conviction that no chronic case of ear disease will get permanently well, so long as the tonsils remain in situ. Pyorrhoeic or abscessed teeth constitute a major unit as agents in focal infection affecting the auditory nerves. Any existing sinus disease should be eradicated so far as possible. In which connection, it is interesting to cite one of our patients, with a rapidly developing deafness, who got promptly well of it, following successful treatment of empyema in one antrum of Highmore. The question of the nasal septum is important. Some observers do not agree that minor deviations have any influence upon function of the Eustachian tubes. After repeatedly demonstrating that many such patients hear better after submucous resection, we are convinced that any considerable distortion of the lumen of the nasal airway has decided bearing upon the hearing difficulty. If there is any question in the observer's mind as to whether the operation should be done, he probably should do it. Certainly, too, no active general pathology should be neglected, as any factor which reduces the individual's vitality and resistance will increase his hearing impairment.

Returning to the method of treatment under consideration, it seems certain, in our minds, that benefit is derived from it, for the properly selected deaf patient. We are presenting herewith several charts which show improvement, precisely measured by the audio-amplifier. It is true that, in the words of a good friend and colleague, "... results never warrant any wild cheering;" but there seems to be some hope offered, in the direction of restorative measures applied to the Eustachian tubes. The degree of improvement appears as a rule to depend upon the length of time loss of hearing has been going on and whether the condition is one of purely conduction deafness. How permanent these benefits are is yet to be determined; and obviously a period of years will be necessary for its demonstration. So far as five years permit us to judge, the restored ability shows greater persistence than does that obtained by any other method yet offered.

Case 1: E. S., boy, age 12 years, consulted us on Oct. 9, 1922, because of loss of hearing. Patient had noticed no trouble with his hearing until two weeks before we saw him. He had had very little trouble with nose and throat.

Examination showed nasal septum somewhat irregular, though the airways were good. Mucosa red at this time. Right ear: Drum dull and retracted; Rinné negative. Hearing: Loud whisper, 6 inches. Left ear: Drum dull and retracted; Rinné negative. Hearing: Loud whisper, $2\frac{1}{2}$ feet. (This was nearly two years previous to the advent of our Audio-amplifier.) The tonsils were of the submerged type, showing slight redness, and some material in crypts. There was some adenoid tissue present.

It was thought the sudden onset of deafness had been due to inflammation of existing adenoid tissue, with consequent congestion and swelling of Eustachian tube walls. The adenoids were removed; and later some Politzeration tried, without much relief to the patient. Later tonsillectomy was performed, following which the patient's hearing improved some.

Examination of Eustachian tubes demonstrated decided scarring, with marked closure, especially of the right one.

Some treatment was carried out, without any appreciable results, until Jan. 6, 1923, when the first dilatation of Eustachian tubes was performed. This was followed up by treatments, given at intervals over a period of some twenty months, during which time there occurred several attacks of rhinitis and one of acute purulent otitis media. At the end of that time our instrument of precision had arrived; and observation of his auditory function showed hearing of 73 per cent in the right ear, and 93 per cent in the left, for the amplified whisper. Bone conduction for the 256 d. v. tone was 103 per cent for each ear. Chart No. 1 shows audiometric curves, though it looks as if there might be some doubt as to the accuracy of C^1 for the right ear.

Treatment was continued, as before, until July 13, 1925. At this time, hearing in both ears had been constant, for amplified whisper at 100 per cent in each ear, over several months. No further manipulation was carried out. Patient was seen on March 11, 1926, for observation, at which time hearing of whisper was still 100 per cent in each ear, and audiometric charts as shown in No. 2. The chief points in which improvement is denoted are: 1. Hearing of whispered voice (decided); 2. tonal perception in right ear, for all of field, with possible exception of C^1 ; 3. ability of both ears to perceive C^1 —or raising of the upper limit of audibility. From the final chart, it would seem that there occurred some lessening of hearing for the lower tones in the left ear.

Case 2: Miss S. B., age 13 years, consulted us in June, 1918, because of gradual loss of hearing. This had then extended over a period of five or six years. Tonsils and adenoids had been removed.

Chart No. 1

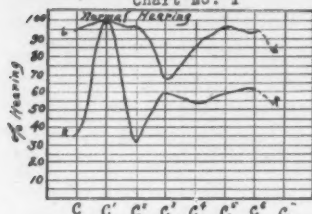


Chart No. 2

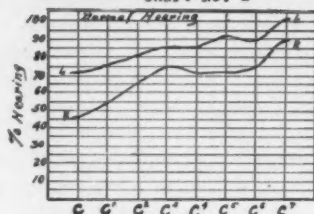


Chart No. 3

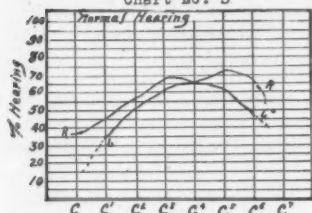


Chart No. 4

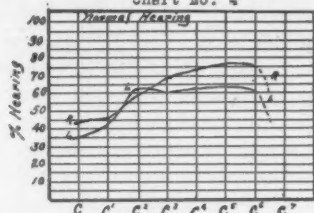


Chart No. 5

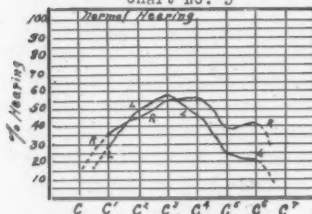


Chart No. 6

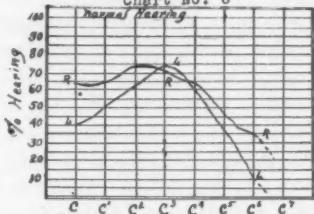


Chart No. 7

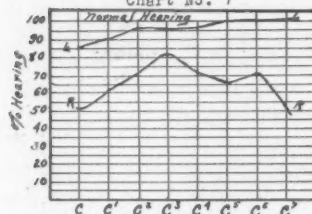


Chart No. 8

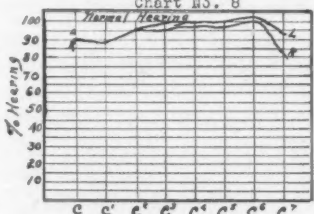


Chart No. 9

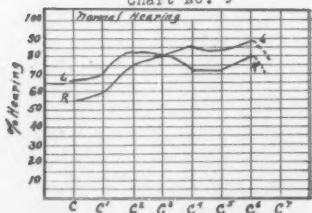
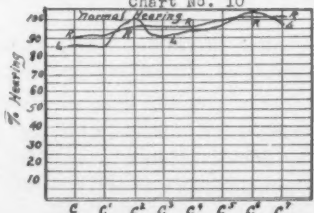


Chart No. 10



two years previous to this visit. Examination at that time showed little of importance, except some deviation of the nasal septum, together with a slight amount of retraction of the tympanic membranes. Hearing was listed as: Right, low whisper, 20 feet; and left, low whisper, 15 feet. Some inflations were given; and the patient discharged.

Patient returned again Oct. 8, 1923, at which time her hearing was taken as: Right, loud whisper, 10 feet; left, loud conversational voice, 6 feet. Examination at this visit showed nasal septum rather far to the left. Eardrums dull and retracted. Eustachian tubes tightly constricted.

Dilatation of tubes was carried out for two months, at the end of which time hearing seemed improved; and the patient left the city.

In July, 1925, she returned, at which time her hearing of the amplified whisper was 83 per cent for each ear. Bone conduction of 256 d. v. tone was: right, 100 per cent; left, 106 per cent. Chart No. 3 shows audiometric measurements.

Following this examination, a submucous resection was performed; and treatment again resumed.

On July 29, 1926, hearing for the amplified whisper was: right, 87 per cent; left, 80 per cent. Upper limit of audibility was: right, 12,300; left, 12,900. Tonal charts at this time are shown in Chart No. 4. Low tone and high tone perception have both been increased in this patient since our first observation with the audio-amplifier. There is no doubt as to the fact that hearing of spoken voice and whisper has been decidedly bettered. This patient also had a good deal of tinnitus, which has disappeared under treatment.

Case 3: Miss K. B., age 34 years, came to us in June of 1923, because of loss of hearing, which had been decidedly annoying for the past two-and-a-half years. Had considerable tinnitus aurium.

Examination showed the nasal septum irregular, but not obstructing; diseased tonsils; eardrums retracted and dull. Hearing at that time was noted as: right, medium conversational voice, 12 inches; left, medium conversational voice, 8 inches. Eustachian tube presented a condition of marked scarring and constriction.

Restorative treatment of the Eustachian tubes was begun. Ton-sillectomy was performed; and the treatment carried on until August, 1924, before the first observations were made with the instrument of precision. At this time hearing of the amplified whisper was: right ear, 73 per cent; left ear, 49 per cent. Bone conduction was 88 per cent for each ear, with 256 d. v. tone. Tonal curves are shown in

Treatment was continued, at intervals, until August, 1926, when the observation diagrammed in Chart No. 6 was made. At this time

hearing of the amplified whisper was: right, 80 per cent; left, 49 per cent; and this had oscillated between these two points and ten points above them during the previous four months.

This patient no longer has any tinnitus. Her ability to hear ordinary conversation is greatly increased. Even aside from the difference shown in her two audiometric charts, this patient's improved tonal perception is attested by the fact that she recently attended the opera, for the first time in several years, and enjoyed it thoroughly.

Case 4: Miss H. M., age 16 years, first consulted us Feb. 2, 1926, because of pain in her right ear, together with some loss of hearing, and at times a discharge from it. The pain in her ear was of low grade, but had been more or less constant over a good many weeks.

Examination revealed a marked deviation of the nasal septum to the right, with puffiness of inferior turbinate upon the left. Tonsils well removed; but some adenoid tissue present. Right ear showed thin serous discharge. Left ear had good light reflex and appeared normal. Hearing of the amplified whisper was 100 per cent in each ear. Bone conduction was: right ear, 112 per cent; left ear, 109 per cent. Upper limit of audibility, 16,000 d. v. for each ear. Tonal curves are shown in Chart No. 7.

A submucous resection of the nasal septum was performed, together with removal of adenoid tissue present. Precise measurements demonstrated that these surgical measures brought about some improvement in hearing. Investigation of the Eustachian tubes discovered constriction.

Under treatments at two and three week intervals, this patient's condition rapidly improved. No discharge came from the right ear, following the first treatment; and the auditory discomfort had vanished within a few days after the nasal operation. Chart No. 8 shows curves taken on the day patient was discharged from treatment (April 29, 1926).

Case 5: Miss B. W., age 16 years, consulted us Sept. 12, 1925, because of loss of hearing and pain in right ear, which she had had for one year. Her ears had never discharged.

Examination showed a nasal septum which bulged to the left, high up, and deviated far to the right below. Tonsils somewhat submerged and diseased. Right tympanic membrane showed considerable retraction. Hearing for amplified whisper was: right, 87 per cent; left, 100 per cent. Bone conduction: right, 100 per cent; left, 94 per cent. The tonal curves are shown in Chart No. 9.

Examination of the Eustachian tubes discovered a decided tendency to constriction.

Submucous resection of the nasal septum and tonsillectomy were performed, resulting in some improvement of patient's hearing. On March 27, 1926, the first treatment to the otopharyngeal tubes was given; and this form of manipulation was carried out, until about May 1, 1926. On May 22, Chart No. 10 was made. At this time hearing for the amplified whisper was 100 per cent in each ear. Bone conduction was 94 per cent for each ear. All discomfort vanished from the ears, following the nasal and throat surgical procedures.

These last two cases illustrate what is possible to be done relatively early in the process. Any otologist of experience succeeds with such patients; but they serve here to bring out the fact that we are not through, when we have completed corrective surgery in the nose, as well as having removed tonsils and adenoids. Such measures really constitute only the necessary preliminary step, before actual treatment of the ears is begun. We have no right to stop there, and ignore the importance of any beginning disfunction of the Eustachian tubes. Our responsibility is in no sense discharged, until we have given adequate attention to these structures which connect up the site of our preliminary corrective work with the lesion we are attempting to overcome. Nature, left to itself, will not do this for us.

From even the few cases presented, it seems evident that something can be done to improve hearing for most of the patients having an ordinary degree of deafness. We believe it is justifiable, however, to again mention the length of time necessary to the accomplishment of this benefit. In our experience, we have been impressed that few individuals with decided loss of hearing can be helped a great deal in less than one year of care. Many of them, indeed, require a much longer time.

The histories presented are only representative, and are offered as evidence that something definite may be done for the impaired hearing, through prolonged attention to the scarred Eustachian tube, which usually is a factor in conduction deafness. Certainly, this does not in any sense solve the problem of hearing restoration. It is our belief that solution of this question lies in dealing intelligently with numerous factors, in any given case; and that the future will bring forth more accurate knowledge as to which measures are most likely to produce results.

There are now extant a good many methods of treating deafness. Whether all or only a few of them give results can be determined only by systematic use of instruments of precision in measuring hearing acuity. Any other plan merely serves to deceive us, as well as our patients; and does not promote scientific progress.

35 East Second South Street.

CHRONIC PROGRESSIVE DEAFNESS WITH PARTICULAR REFERENCE TO THE CLINICAL ASPECT.*

MAJOR ROBERT E. PARRISH, Medical Corps, U. S. Army.†

Under the classification of chronic progressive deafness I wish to include all forms of impairment of hearing not due to intracranial conditions, injury to the ear or auditory nerve, tumors or the chronic suppurative involvements. It is probable that the deafness of some of these cases resulted from a suppurative process, therefore some nonsuppurative cases without evidence of destruction of the drum or ossicles may be included; these certainly cannot be excluded.

A further division of these cases into conduction, reception and mixed forms is essential to aid in localization of the disease process. It is rarely that any particular case will fall into a single one of these groups. Many are so affected that there is about an equal involvement of the conductive and receptive mechanisms and these, therefore, are called mixed.

It is interesting to note at this time that the existence of otosclerosis as a separate disease has been recently questioned. I refer to an article by R. Lake,¹ who considers this condition "from a clinical point of view ill-defined and I think not proven as such." The necessity for us to prove the existence is perhaps unnecessary, even though it is of extreme interest as an academic problem. Certainly the condition is not a common one.

The large group of conditions which may affect the conduction of sound by interference with the conductive mechanism may be readily appreciated if the anatomy of this portion of the ear is considered together with the anatomy and pathology of the ear and its adjacent structures. In many of our texts, much space is consumed with a detail description of these conditions and their treatment from a local standpoint; very little space is given to a discussion of the causative factors and the necessary steps required in their correction.

The group of cases with deafness as a result of some abnormal condition of the receptive mechanism may be divided into two forms; neuritis of the auditory nerve and nerve endings, and degeneration or atrophy of these same structures.

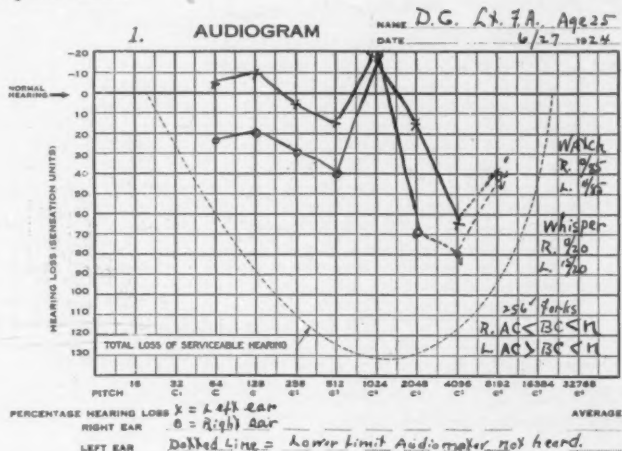
*Read before the Section on Ophthalmology and Otolaryngology of the District of Columbia Medical Society, Washington, D. C., April 23, 1926.

†Published with permission of the Surgeon-General, U. S. Army, who is not responsible for any opinion expressed on conclusions reached herein.

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These last named conditions may affect only a portion of the receptive mechanisms, but if there is no tendency towards improvement, I believe it is safe to consider the possible presence of some degenerative process in the nerve or receptive structures. The condition which I have called neuritis may be the first stage of the degenerative process. These conditions are commonly regarded as nerve deafness and, contrary to the observation of some writers, I have found this to be a common form of deafness. This form is also associated with many of the cases with involvement in the conductive mechanism.

In handling these cases of impaired hearing, many factors have to be considered. Once the diagnosis is made the patient should be told the plain facts.

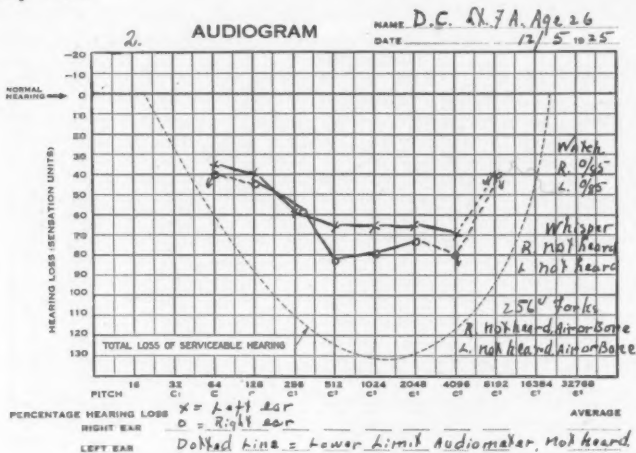


He should be told what factors may be present in his body, which may, in some way, aggravate his condition. He should be told what external factors under his control may be of importance to him. He should be told that the tendency of chronic deafness is to gradually get worse, but with proper medical and surgical aid he will be given the best chance for improvement, or, if not improved, the progress of his deafness may be arrested or slowed up to a maximum degree. By such positive handling of our intelligent patients, we may be able to keep many cases away from the "quack" or similar frauds.

If we stop to review the histories of our cases we will find that many of the patients, when seen, have been suffering from more or less impairment of hearing for years. The frequency of deafness in

childhood is just being appreciated by the profession, and it is hoped that in the near future the ears will be examined in the schools just as carefully as are the eyes. Often the hardest thing for us to overcome is the conflicting advice given to our patients by members of our own profession.

This condition, as the name implies, is a chronic condition, with a distinct tendency to progress. Progress is not a gradual one, but is irregular or wave-like. The crest of each wave, however, will usually be a little lower than the one that preceded it. These waves or variations in the course of the condition, may be, and often are, produced by such things as repeated acute infections of the upper respiratory tract.



The diagnosis of our cases of chronic progressive deafness requires a careful examination of the ear, nose and throat in addition to the functional hearing test.

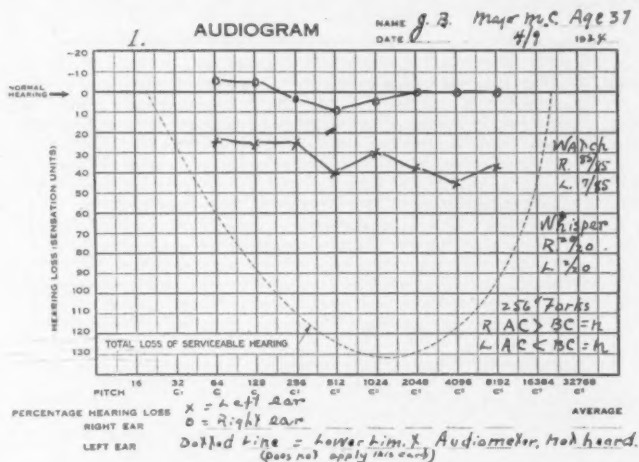
The functional hearing test consists of various tests, which, when considered together, present a picture of great value. The tests I will mention are the following: The voice, whisper and conversation; the watch; the forks, including the relationship between air and bone conduction and between bone conduction and normal bone conduction; and last the electric device, the audiometer No. 2-A, Western Electric Co.

The whisper test is very valuable if properly carried out and properly interpreted. The watch test is perhaps the best simple single method to detect the average early case of impairment. However, the

watch test is subject to great variation if the examiner does not use the same watch for all cases, having first ascertained the average distance that the normal individuals can hear the watch being used, together with uniform conditions under which to carry out the test.

The importance of the fork tests are most appreciated as links in our chain of evidence in locating just what portion of the hearing mechanism is affected.

The audiometer already referred to represents a wonderful advance in our apparatus for the examination of our patients. After three years' use of this instrument I have learned to appreciate more and more the necessity for such or similar apparatus. I would like to refer to three fairly definite pictures which we get, which divides



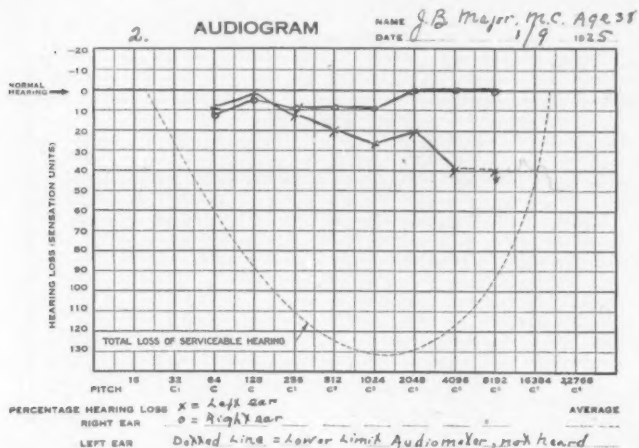
our patients into three different but distinct groups. Considered together with our other tests, we can be much more certain of our classifications. The pictures are a predominating loss of the low tones, a predominating loss of the high tones or a more less uniform loss of all tones ranging from 64 to 8192 vibrations per second.

The audiogram or the prescribed method of recording the findings may now serve as a permanent record to which we may refer and by re-examinations from time to time we may ascertain what progress is being made by our patients. I hope it will be only a short time before such a method will be more universally used. The tests are quickly and easily performed. A trained nurse or a technician can soon become proficient and much of the specialist's time can be saved.

In a review of the findings in one hundred unselected cases taken from nearly four hundred cases of impaired hearing on whom I have audiogram records, I wish to present the following figures: 36 per cent nerve or receptive deafness; 20 per cent middle ear or conductive deafness; 44 per cent mixed deafness.

The voice, watch, fork and audiometer were all used to determine the group in which to place each case.

These cases represent mostly mild or moderate degrees of deafness. The average ages of the patients in this series: 1. nerve deafness, age 42 years; 2. middle ear deafness, age 32 years; 3. mixed deafness, age 37 years.

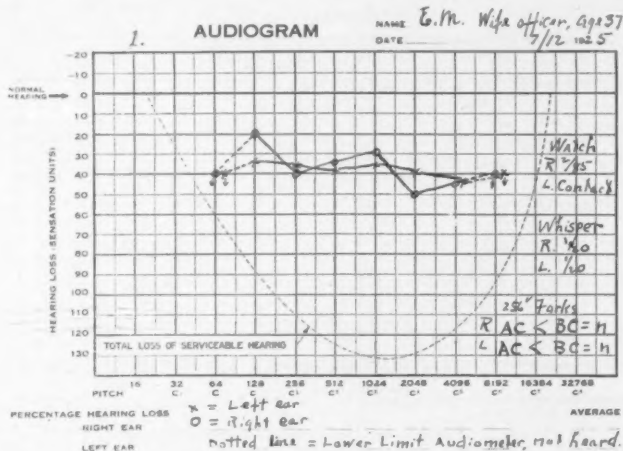


In the thirty-six cases which I have classified as nerve deafness, there was no history of meningitis. Syphilis could not be determined by the history or the blood test except in four cases of the series. In this respect my cases which I am including in this report, and many others which I have seen but which I am not including, is at variance with the findings of the Committee on the Problems of the Hard of Hearing, Section Laryngology, Otology and Rhinology,² which reads as follows. "Nerve deafness is rare except in syphilis and meningitis."

Heredity as a factor in deafness appears to have been greatly exaggerated. If it is a factor, I believe contact is far more important. The prevalence of acute colds and acute respiratory infections, particularly in childhood, may explain much of the apparent family

tendency to hearing defects. When one child gets a cold the other members of the same family rarely escape. Hearing defects thus produced progress slowly and are noted later in life, either when an examination is made or when the deafness has become manifest in some other way.

Perhaps the most important work that can be done by the ear, nose and throat specialist is the careful treatment of the ears, nose and throat so that deafness will be less frequent or actually prevented. Once the condition of chronic progressive deafness has become established, we must analyze our cases to determine if any abnormal conditions exist that may influence the progress of the condition. Prompt corrective measures must be taken to clear up these abnormal conditions. A complete history and a complete physical survey is essential.



Infection is the most important thing to be considered. Infection of the upper respiratory tract, teeth, tonsils and mouth or the so-called focal infections bear such an important relationship to the diseases of the ears and deafness that too much emphasis cannot be placed on them. This focal infection must be eliminated. The gastrointestinal tract must be considered as a site from which toxins may be absorbed that may influence our cases.

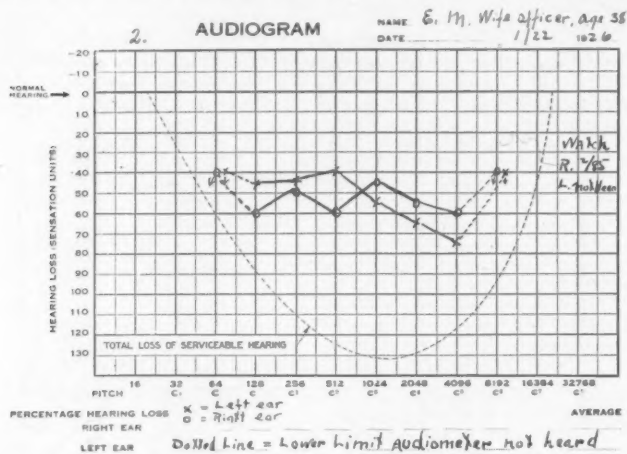
Chronic constipation should be corrected. Gallbladder disease is of importance and should be treated.

Anemia, syphilis and the other so-called constitutional diseases must be diagnosed and treated.

Endocrine disturbances must be looked for and corrected. In the woman, pregnancy with its associated toxemic periods must be considered.

The general health of the patient must be kept up in every possible way. All outside agents that may act as poisons or produce toxins directly or indirectly affecting the ear must be eliminated if possible. These include coffee, tea, alcohol and tobacco.

Anything short of complete eradication of all definite foci of infection is to be regretted. Re-examination will be required at frequent intervals to determine if further foci have developed that may require elimination. The re-examination should also include the state of the hearing, and in this way it will be possible to keep a record of any change in the progress of the case.



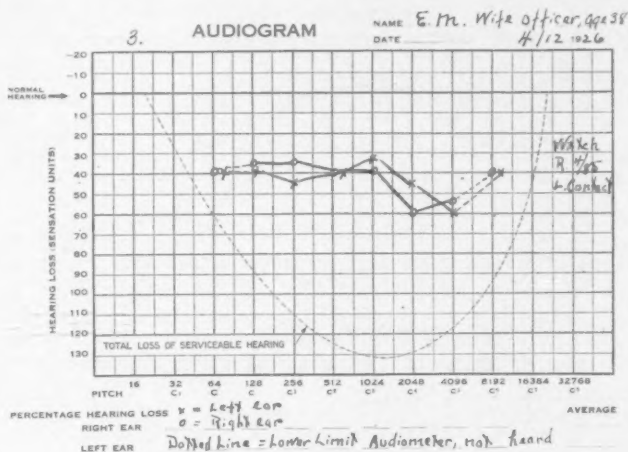
These re-examinations should be made about every six months. When the initial survey has been made and foci found cleared up, the story has just begun, the later chapters will tell us the outcome; therefore, it is necessary to follow up each case.

The local treatment of the ears is of minor importance and much time has been wasted in carrying out procedures of this kind. Temporary subjective relief may be noted, but the ultimate outcome is essentially the same.

The benefits to be derived from local treatment, even of the middle ear group of cases, is open to question, and the nerve cases and the so-called otosclerotic cases may be actually made worse. One of the conclusions of the Committee on the Problems of the Hard of Hear-

ing Section, Laryngology, Otology and Rhinology, previously referred to, is heartily concurred in: "Mechanotherapeutics or electrotherapeutics produce no beneficial results."

The consideration of these factors are perhaps more important in the so-called otosclerotic cases than any other class of cases. Occasionally we see cases of this condition that have remained quiescent for years. With the proper treatment, as previously outlined, it is my belief that the progress of this condition will be slowed up for the maximum period of time. Acute or chronic toxic conditions will aggravate this form of deafness as much, or more, than it will the other forms. Recently a patient with the otosclerotic form of deafness came under my observation suffering from an acute suppurative max-



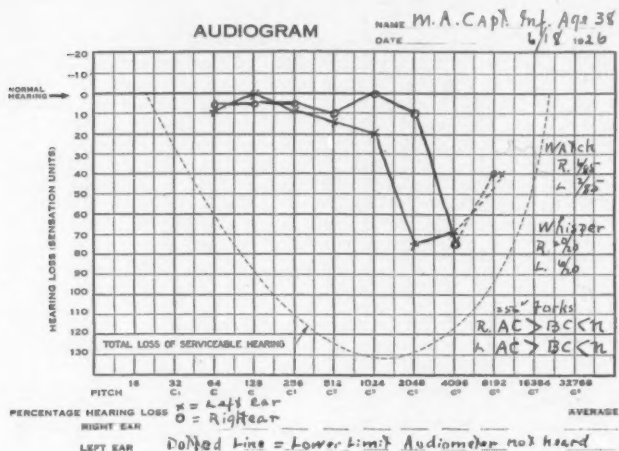
illary sinusitis. Incident to the attack of sinusitis the patient's deafness was increased nearly 15 per cent. It was a bilateral increase without any signs of acute middle ear involvement. With the proper treatment and after-recovery of the sinus infection, the hearing improved, returning to near its former level. The course of the case was followed with the audiometer.

Middle ear deafness is most apt to improve after removal of focal infection and the mixed forms show improvement chiefly for the lower pitch sounds. It has been my observation that once the high pitch sounds have become diminished, even to a slight or moderate degree, little or no improvement is to be expected as far as these high pitch sounds are concerned.

It is rarely that we see a case of chronic progressive deafness that is a clear-cut middle ear condition, the nerve is nearly always involved to some extent. The reason the figures which I have already given are not different is because the attempt at classification placed the case in the group in which the predominating process tended to throw it.

Nerve deafness can progress just as rapidly as any of the other forms, and it may also affect young individuals, although the tendency is for it to come on later in life than the other forms.

Never promise to cure any case of chronic progressive deafness, but never dismiss the case. Something may bob up at any time which,



if treated promptly and properly, will tend to save any remnant of useful hearing that is remaining. If necessary, aid the patient in obtaining a suitable hearing device. instruct him in the benefits to be derived from lip-reading and acquaint him with the organizations handling the problems of the hard of hearing.

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OTITIC MENINGITIS AND BRAIN ABSCESS. RECOVERY, WITH OPERATION.*

DR. V. K. HART, Statesville, N. C.

This case is presented because: 1. A brain abscess and a purulent meningitis coexisted in the same patient. 2. Recovery rarely follows such extensive pathology of the central nervous system. In this sense it is a remarkable case.

A brief review of the clinical history will give a more intelligent concept of the patient, a white male, age 18 years. He first came under observation April 10, 1926. At this time he had a frank subperiosteal abscess behind the right ear. This was unfortunately of six weeks' duration. The X-ray showed diffuse involvement and there was a profuse purulent discharge from the right middle ear through a large rupture of the drum. The boy was of robust type, and obviously ill. However, the rest of the physical examination other than the right ear was negative; therefore, immediate operation was done. The W. B. C. was 30,800 and the temperature was, oddly enough, normal.

Under ether anesthesia a right mastoidectomy was done. Diffuse destruction of the mastoid cells was found with perforation of the cortex and a subperiosteal abscess.

Post-operatively the wound continued to discharge despite all therapy, including even Dakinization. One month and ten days later a second operation was done under local. At this time the lateral sinus was freely uncovered and part of the dura in the middle fossa was exposed because of overlying necrotic bone. No closure was attempted, and the wound left open to permit ample drainage.

Following the above intervention and therapy the wound became rapidly clean and healthy granulations appeared. A few weeks later a secondary closure was done under local anesthesia, after which in a few days the patient was discharged from the hospital.

The wound later broke down and discharged in the upper angle. This was treated by appropriate measures.

Then on the morning of August 5, 1926, the patient was readmitted to the hospital in what the writer deemed a dying condition. There was: 1. Coma. 2. Restless delirium. 3. Rigidity of neck and accompanying Brudzinski and Kernig signs. 4. Temperature 104° (axillary).

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The laboratory findings confirmed the clinical picture. The urine contained sugar and acetone bodies. The spinal fluid was of a milky color and its cell count was so high as not to be able to count it accurately. It was estimated at about 10,000, polymorphonuclears, 76 per cent; and lymphocytes, 24 per cent.

The author had never seen a case, with such an extensive meningitis of otitic or other origin recover and, therefore, gave the family a very grave prognosis. Much to his amazement, however, the patient regained consciousness the following day, although in the interim the temperature had gone to 105.6° (axillary). Even when first rational it was 103° (axillary).

An explanation of this turn for the better is found in a study of the spinal fluid. *The culture of this fluid was sterile.* This meant that probably there was not a diffuse infection. A smear of a centrifuged specimen showed what might have been a few extracellular gram-positive organisms resembling streptococci. There were not many, however.

He began to take fluids freely by mouth. Of course, digitalization, ice caps, tepid sponges, etc., had been instituted early. His temperature continued to seek a lower level, dropping as low as 98° (axillary) the afternoon of the second day. Such improvement pointed to localization of the process.

Necrotic bone had been freely removed previously. The blood culture was negative. Therefore, a brain abscess was strongly suspected. This suspicion was much accentuated by a deep-seated pain through the right eye. Moreover, his general condition steadily improved, pointing to increasing localization.

The location of the abscess was thought to be in the region of the right temporal lobe because of the absence of cerebellar and motor symptoms. Furthermore, the patient was right-handed and aphasic symptoms due to an abscess of the temporal lobe would ensue only if the lesion was on the left side. In other words the lesion was probably in a "silent area."

He was thought in good enough condition to warrant an exploratory operation four days after admission. His nutrition had been forced. Orange juice had been given with other liquid nourishment, combined with small doses of insulin. Sugar and acetone bodies had disappeared from his urine. Remissions in temperature occurred with a tendency to a lower level. The spinal fluid cell count had dropped on August 7, 1926, to 867 per c.m.m.

Therefore, he was operated for a fourth time under local anesthesia on August 9, 1926, five days after admission. The roof of the mastoid and antrum had previously been largely removed, but the

exposure of the dura in the middle fossa was enlarged. Also the incision was carried upward and a large part of the squamosa removed in order to expose the temporal lobe on its lateral aspect. The dura over such appeared entirely normal.

However, there was a suspicious pouching of the dura over the antrum on the inferior aspect. A small incision was made through the dura with a sharp scalpel and then a Dean knife inserted gradually and rotated during insertion. At a depth of about one-half inch a few particles of thick pus escaped. When a depth of approximately 1 inch was reached thick purulent pus to the amount of about one-half ounce was evacuated. An iodoform drain was inserted. The squamosa area of the wound was closed but the post-auricular portion was left widely open and a sterile dressing applied.

Post-operatively the temperature dropped rapidly to normal and remained there. The wound was dressed every other day. The abscess cavity could be probed to a depth of 2 inches and 3 to 4 c.c. of pus evacuated by suction. A small rubber tube drain was found to be the most satisfactory. The cavity continued to discharge profusely for three weeks, after which there was little or none. At this time the wound was allowed to granulate from the bottom by packing properly. Uneventful convalescence followed.

Discussion: The best classification of meningitis that the writer has seen is by Kerrison. He divides the same into: 1. Pachymeningitis, local. 2. Serous meningitis. 3. Circumscribed purulent leptomeningitis. 4. Diffuse purulent leptomeningitis.

The first is often seen in mastoid surgery. It is a localized, inflamed area of dura due to overlying diseased bone. Recovery usually follows removal of the bone and as a rule there are no meningeal symptoms.

The second type occurs as a result of the first group. Because of the inflamed dura, there is some edema of the arachnoid and pia. In other words, the reaction also involves these membranes. There may be mild meningeal symptoms and slight increase in the spinal cell count.

The third class is nothing but a more severe reaction than the above but still part of an inflammatory reaction to a diseased dura. In such cases the infection probably enters the subdural space, attacking the arachnoid and pia. Nature promptly attempts to wall off this invasion. If she succeeds there results a localized purulent leptomeningitis with or without abscess formation. The spinal cell count is greatly increased but culture shows it to be sterile, though Kerrison says even a few organisms may escape into the spinal fluid.

The fourth class is invariably fatal. Nature fails to halt the invasion and there occurs a diffuse infection involving the arachnoid and pia.

The case under discussion undoubtedly falls in the third class—circumscribed, purulent leptomeningitis. A frank abscess resulted. This was largely subdural but the cortex of the brain was involved to some extent because the cavity by actual measurement had a depth of 2 inches. Of course, deep-seated abscesses may occur without a pre-existing subdural abscess. It is this type which is extremely difficult to locate and often takes a number of exploratory punctures. The location of these depends on the symptoms. It is not the function of this paper to discuss the technique of the same.

It is interesting to speculate as to why an infection in one case will cause a lateral sinus phlebitis and in another a brain abscess or meningitis or both. No logical explanation can be offered. Recently a case was seen where the blood culture was positive for streptococcus four days after the onset of an acute ear. A clot was demonstrated in the lateral sinus at a later operation. (Reported in *Southern Medicine and Surgery*, August, 1926.) Such, of course, represents an extremely virulent infection.

As far as the type of infection goes, the case ran true to form. Culture of the pus at operation gave streptococcus and staphylococcus. Most intracranial complications are of streptococcal origin.

Summary: One is inclined to blatantly herald the excellence of his work. Nevertheless, in this case there was no unusual surgery. The opportune time of intervention is more important. It must be neither too early or too late.

Moreover, there are two other very important factors favoring recovery in the case under discussion. First, the infection was of a four months' duration before the intracranial complication occurred and he must have, therefore, developed considerable immunity. Secondly, the patient was of splendid physique.

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USES OF EPHEDRINE IN RHINOLOGY.*

DR. C. C. MERKEL, Iowa City, Iowa.

Certain pharmacologists and physiologists have done considerable work during the last year with ephedrine. We have made some clinical observations in the last eight months on the use of this drug in the treatment of nasal disorders. We wish to present this paper as a preliminary report.

Ephedrine is an alkaloid and the active principle of the Chinese plant *ma huang*. The Chinese are said to have used this plant 5,000 years ago in the treatment of asthma. Recently the Japanese have reported the use of preparations from this plant in combination with other drugs in the treatment of the same condition.

Chen, Schmidt, Nagai and others have studied the action of the drug and from their observations have reported that its effects are very similar to those of epinephrine. Chen and Schmidt¹ observe that 25 milligrams of ephedrine given intravenously cause a rise in blood pressure, cardiac acceleration and vasoconstriction. They demonstrated that the effect on circulation was due largely to a stimulation of the cardiac accelerator mechanism through the ganglia and nerve endings simultaneously. They also showed that the drug, in large doses, caused depression of cardiac muscle and a lowering of blood pressure. Amatsu and Kubota² have shown by the action of ephedrine on the intestines that smooth muscle is relaxed. It has been demonstrated by Chen³ that the drug can be used to control hemorrhage and that it is also useful in the treatment of shock. The action of the drug in causing mydriasis was first recognized by Muira.⁴ It is said to have some antipyretic and diaphoretic action. Chen⁵ has proven that the toxicity is low. The minimum lethal dose in animals is, depending on the mode of administration, from 40 to 100 times as great as the amount needed to bring about definite changes in blood pressure, pulse and vasoconstriction. Miller⁶ states that the drug can be administered by mouth, as it is not affected by the hydrochloric acid of the stomach. Fetterolf and Sponsler⁷ were among the first in this country to report the effects of the drug on the nasal mucous membrane.

Chemically, the drug, compared with epinephrine, contains an extra methyl radical and an absence of a phenolic hydroxi group. In view of its physiological effects it should be included in the group of natural amines which possess "sympathomimetic effects."⁸

Ephedrine may be obtained in the alkaloidal, chlorid and sulphate forms. There are three varieties of the plant: American, Chinese

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and German. The German variety produces an isomer of the Chinese drug. It has been called pseudoephedrine. The salts used in this study came from China and were obtained through the courtesy of Dr. Geo. F. Fiske. The pure white crystals of the two salts are freely soluble in distilled water. Of the two salts the chlorid has proven more satisfactory.

The strengths of solutions used were 1, 2, 3 and 5 per cent. The 3 per cent solution was found to be as effective as the 5 per cent one in the observations covered by this study, the former having the same duration of effect as the latter. It has an advantage over the 1 per cent solution in that it has a more prolonged effect. The stability of ephedrine is much greater than that of epinephrine. A colorless glass vial containing a 3 per cent solution was placed in direct sunlight. At the end of two weeks the contents showed no change in physical characteristics and had lost no power of action. Kept at ordinary room temperature for a month, there is no change. A 3 per cent solution was not decomposed by boiling.

The prevalence of acute nasal and accessory sinus disorders in this country and more especially in those parts subjected to rapid and marked temperature variations makes evident the need for simple and rational local therapeutic measures. One is impressed by the inefficiency of many of the drugs in present use.

In general, local nasal treatment is indicated in: *a.* Acute nasal and accessory sinus disease in adults where surgery for one reason or another is contraindicated; *b.* Chronic nasal and accessory sinus disease in adults where it is an adjunct to surgery; *c.* Acute nasal and accessory sinus disease in infants and children where surgery is justified only when complications arise; *d.* Chronic nasal and accessory sinus disease in children where surgery should be avoided except for the removal of toxic foci.

Acute inflammations of the nose and accessory sinuses which lack indications for surgical interference but cause local discomfort and produce systemic effects should be relieved by any procedure which will diminish congestion and facilitate drainage. Ethmoiditis in children should respond to any measure permitting ventilation and drainage. Acute rhinitis with congested turbinated bodies touching the septum, flattening against it and thereby blocking the maxillary and ethmoidal ostia, presents opportunity for sinus infection. It is well established that any body cavity which has an occluded outlet can easily become infected, as, for example, the urinary bladder blocked by an adenoma of the prostate, a foreign body in the bronchus or a stone in the ureter. The nasal sinuses are likewise susceptible to this condition.

Ephedrine has been used in this clinic for eight months in both children and adults for diagnosis and local treatment. Three methods of application were used: 1. spray; 2. topical application with cotton on a probe; and 3. introduction into the nose on cotton packs. The first is advantageous in treating infants where cotton on a probe would be difficult of application and where the treatment is to be given by one unfamiliar with the anatomy of the nose. The posterior parts of the nose cannot be reached by the spray when the anterior ends of the turbinated bodies are swollen. A second spraying is therefore necessary after the anterior has been shrunk.

Any or all parts of the nasal mucosa in adults can best be reached by the probe method. The cotton pack method is efficient but more painful. Ephedrine does not need to be in contact with the nasal mucosa for more than a few seconds. A pack left in situ for three minutes causes no more contraction.

Fifteen infants in the children's wards having definite evidence of ethmoiditis were treated with ephedrine. These cases were referred by the Department of Pediatrics to the Department of Head Specialties. The medical diagnoses included celiac disease, hereditary syphilis, eczema, rickets, arthritis and athrepsia. The symptoms manifested were inability to gain weight, unexplained temperature or profuse nasal discharge.

The sinuses were as a rule examined under ethylene anesthesia. The nasopharynx and ethmoidal regions were examined by means of the nasopharyngoscope. The maxillary antra were punctured, sterile saline injected and immediately aspirated; the technique of examination having been fully described by Dean.⁹ These patients showed definite suppurative ethmoiditis and the following treatment was instituted: the nose was irrigated with a warm saline solution twice a day; one-half hour later a 2 per cent solution of ephedrine chlorid was sprayed on the nasal mucosa, and five minutes later 3 drops of a 5 per cent solution of argyrol were placed in each nostril. Observation of the anterior ends of the middle and inferior turbinated bodies revealed a definite contraction within two minutes. The posterior portions could now be better observed and if these remained enlarged another application could be made. The contraction was always sufficient to make the middle meati visible. Relaxation never appeared until after a period of from three to six hours. Free ventilation and drainage were thus amply provided throughout this period of time.

Treatment of ten infants by the above method resulted in a diminished nasal discharge in from five to seven days. In two weeks the discharge had entirely disappeared in seven cases. Two required three weeks. One, a luetic, failed to respond. With the discontinuance of the ephedrine treatment, the discharge recurred within a

week in three, even though the irrigations and argyrol installations had not been suspended. Two infants developed mastoiditis, one pneumonia and two left the hospital. These interrupting factors did not permit final observations on these cases. The weight curves of seven began to rise as the nasal discharge diminished and continued to do so until these observations were terminated. Two others had descending weight curves which returned to a level. The syphilitic infant continued to lose weight. There was a definite lowering of temperature as the nasal discharge diminished in amount.

Three infants with posterior cleft palates were examined because a definite view of the posterior ends of the turbinated bodies could be obtained in each. Each had a severe chronic ethmoiditis, due to the mechanical conditions present, whereby infected food became lodged in the meati. A 3 per cent solution of ephedrine was applied topically and a direct view of its effects on the mucosa could be obtained. Contraction of the tissues could be noted within two minutes. This very rapidly became maximal and continued from three to six hours. No secondary relaxation such as follows the use of epinephrine was noted. Application of the drug at four-hour intervals, *i. e.*, three times a day, kept the turbinated bodies in a state of continued contraction. The intensity and duration of the action remained unchanged after the preparation was used daily for two weeks.

Ephedrine has been used in a large number of adults for diagnostic and therapeutic procedures. The 3 per cent solution proved most practical and one application has been found sufficient. Ephedrine was applied to the anterior portion of the middle meatus at the opening of the nasofrontal duct in three cases of suppurative frontal sinusitis. A stream of pus appeared in this region within a few minutes. Following this, there was relief from headache and disappearance of Ewing's sign. One case of empyema of the right maxillary sinus was examined. The ostium could be seen through the nasopharyngoscope. The mucosa was so congested that there was no possibility of drainage. Following the application of 3 per cent ephedrine to the middle meatus a stream of pus could be seen pouring down over the inferior turbinated bodies. After nasal irrigation the nasopharyngoscope was reintroduced and pus could be seen emerging from the now patent ostium.

In numerous cases of acute ethmoiditis, nasopharyngitis and so-called rhinitis the solution has been applied to the mucosa. A constriction is noted beginning in from 40 to 60 seconds and becoming maximal within three minutes. The tissues contracted tightly over the turbinated bones and continued to do so for from two-and-one-half to five hours. Daily use over periods of ten days shows, as in chil-

giving up tobacco. In view of the fanatical outbursts against smoking by some present-day reformers, I have thought it apropos to mention these marvelous cures, since they are being circulated even nowadays.

Since that time many a drop of water has run down the Hudson, many a pipe and cigar have been smoked and many articles and books have been published for or against the use of tobacco. Much of the writing, however, has been done by those who were enemies or friends of the weed, and who often knew little or nothing of the subject with which they were dealing. The idea that had been promulgated all over our country that it is unhealthy to smoke is in strong contradiction to physiological knowledge and our experience in medical practice. Such an idea, made popular in many parts of the Union, is nothing but a popular delusion—"a delusion which even a moderate acquaintance with the first principles of physiology cannot fail to dissipate. Nay, more; if our interpretation shall prove to be correct, it goes still further. It says that smoking, so far from being detrimental to health, is, in many cases, where excess is avoided, beneficial to health; in short, that the careful and temperate smoker is, other things equal, likely to be more vigorous, more cheerful, and more capable of prolonged effort than the man who never smoked."

The same applies to tea and coffee, if abused. As Fiske says: A concentrated dose of tea will produce a paralytic stroke; and a single cup of very strong coffee is sometimes enough to cause alarming disorder in the heart's action.

What has been done in this country from the era of famous Mrs. Nation to the present day of bootlegging, in which army and navy, local and state police had to be mobilized in order to hunt the imaginary enemies of society is well known to all of you. In reality it has been a war against 80 per cent of the population. What is our stand as physicians on this question?

Let us discuss in more detail the subject of tobacco, quoting some other writers of former days. Says a certain Wm. A. Alcott in the year 1845: "The slave of tobacco, like him who is enslaved to the use of rum, opium, coffee or tea, is, in my view, a diseased person. Shall we come down in vengeance upon the sick?"

Come down with a vengeance upon the sick? Vengeance means revenge. All this sounds like the vehement talk of a fanatic, and not like the medical and spiritual ministrations which we as physicians would extend to the victim of a habit to afford him relief. But fanatics were the same in 1845 as they are in 1927. Tobacco, rum, opium, coffee, tea, they all have to go to satisfy the taste of such would-be reformers.

Says Dr. Rush, another writer: "Were it possible for a being who had resided on our globe to visit the inhabitants of a planet where reason governed, and to tell them that a vile weed was in use among the inhabitants of the globe he had left, which afforded no nourishment; that this weed was cultivated with intense care; . . . that the want of it produced much real misery; that its taste was extremely nauseous; that it was unfriendly to health and morals, and that the use of it was attended with a considerable loss of time and property, the account would be thought incredible."

In contrast to this, medical opinion will agree that tobacco is as harmless as ice cream *IF* taken moderately. Some people's digestion is helped materially by a smoke; with others a smoke before retiring quiets the nerves and produces a better night's rest. The same may be said of the upper air tract. There are millions of persons who experience absolutely no ill effects from the moderate use of tobacco neither in the throat nor elsewhere. They derive pleasure from it and live to be as old as others who do not smoke. I would not "come down with a vengeance" on these people and destroy their happiness and health.

On the other hand, there are individuals to whom even moderate smoking is injurious. We as physicians cannot close our eyes to the injuries done to some by moderate, and to many by excessive, use of tobacco. We simply have got to find a remedy to counterbalance the evil.

No doubt there are many who belong to the class of inveterate smokers, but let us deal first with the mild variety, especially the female sex. Since women have adopted the habits and vices of men, the detrimental effect of tobacco can be easily studied on them. Nowadays we often see a delicate girl who follows the modern fashion of smoking. Very soon an irritation of the throat sets in, a cough appears and the mucosa of the pharynx and the nose becomes congested. This irritation may spread to the larynx and cause hoarseness. Such instances, in my experience, have been more frequent in young girls and women than in boys and men. But irrespective of that fact, those who cannot tolerate even the moderate use of tobacco should be advised to give it up entirely.

It seems to be our duty to do a great deal of prophylactic work in this direction and teach the people what is good for them. And let me tell you this, a million dollars worth of education is of greater value than a hundred million dollars worth of prohibition.

In this field not much educational work has been done during the past ten or twelve years in the United States. On the contrary, I am

giving up tobacco. In view of the fanatical outbursts against smoking by some present-day reformers, I have thought it apropos to mention these marvelous cures, since they are being circulated even nowadays.

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In this field not much educational work has been done during the past ten or twelve years in the United States. On the contrary, I am

tempted to say that rather the opposite has happened. Just recall the newspaper agitation to send cigarettes abroad to our boys in the field. Even those who had never smoked before acquired the tobacco habit, and, what is worse, indulged excessively. After their return many discovered later that what they could do without harm while out in the open was not tolerated when they pursued a sedentary life. They became frequent visitors to clinics and offices. A man confined to his desk all day is apt to show bad results from oversmoking, especially when his upper air tract has previously been a *locus minoris resistentiae*. On the other hand, there are hosts of laborers engaged in heavy physical work in the open air, who constantly smoke and deeply inhale the fumes, and these also sooner or later experience detrimental effects in the nose and throat.

But there are others who are so addicted to tobacco that they have become tobacco maniacs. This, I am sorry to say, is true especially of women in the past few years. The use of tobacco by them is neither a matter of joy nor sorrow. But its abuse has been noticed so often by the writer that he cannot help seeing in this another sign of the steady decadence of our so-called civilization, and particularly of womanhood. Let me give you two examples.

Mrs. A. N., widow, age 26 years, coughs incessantly, has occasional headache, can breathe well, but is "very nervous." The entire mucous membrane from the nose down to the trachea was highly congested and swollen. Examination was rather difficult on account of the constant coughing. I was almost inclined to consider the condition as "nerves," which, in most instances, is only a lack of our ability to make a diagnosis, when the odor of tobacco struck me. On inquiry her sister volunteered the statement that Mrs. N. smokes all day long and in addition has such a craving for tobacco that she gets up once or twice during the night in order to take a "puff." She called a few times and then disappeared, unimproved.

Another case is that of an advertising agent, Milton C., age 28 years, married. He does not breathe well through the nose, has always a "cold on his chest, and says he smokes 100 cigarettes a day. I found the same condition as in the former case, plus a bronchitis. This man was cured "over night," as he stopped smoking immediately and never took it up again.

Similar conditions had been observed in other parts of the world long ago. Thus, for example, tobacco was forbidden in England in ale houses, as it was supposed to create great desire for strong drinks. Long before the close of the seventeenth century ladies of social standing smoked, and in 1708 one finds the governor of Massachu-

setts showing friendly feeling by sociably smoking a pipe with the wife of Judge S (quoted from A. A. Brill). But, as you well know, these fashions disappeared, only to return again.

Cases of *chronic laryngitis* in people addicted to tobacco are very usual in our practice. Most of them are easily recognized, while in others the diagnosis is somewhat difficult. I have still under treatment a man who consulted me a little over twenty years ago. At that time he was 42 years old, had been hoarse for several months, coughed and lost weight. For some time his larynx looked like one seen in cases of carcinoma. The ventricular bands were irregularly swollen, the left perhaps a little more, and the vocal cords highly injected. It seemed as if the left vocal cord did not move fully. After applying the usual remedies locally and following general hygienic directions, he slowly improved, so that everything cleared up perfectly. Then he again began to smoke heavily just as before, with the result that I have had him under treatment on and off ever since.

Another case is that of a younger man, age 35 years. He, too, smokes incessantly and is a severe neurasthenic. Whether his neurasthenia is due to nicotine poisoning or not is impossible to decide. I have known him for two years, he shows up occasionally, calls on a number of other colleagues in the interim and keeps on smoking. His symptoms are about the same as in the foregoing case.

The manner in which the effect of smoking manifests itself on the mucous membrane is twofold. Firstly, as has been pointed out by Hagedorn, the smoke itself has an irritating effect on the mucosa of the nose and throat, and in heavy smokers, especially cigarette smokers, chronic catarrhs of the mouth, nose and pharynx result. According to Hagedorn these catarrhs are characteristic in that the mucous membrane appears red, smooth and shining. I had a somewhat different experience. In some instances the above is true, while in many cigar workers, for example, I have often observed that the mucous membranes are not dry but moist, etc. Whether that be due to climatic influences or not, I cannot say.

However that may be, the worker in a tobacco factory shows early signs soon after he starts in this occupation. These are the usual manifestations of a strong irritation of the mucous membranes, as sneezing, lachrymation, coryza, epistaxis and even cough. Later, when such a person gets accustomed to the work, these acute symptoms disappear, but a chronic nasopharyngeal catarrh remains. Besides, an eczema of the introitus of the nose, and not infrequently erosions of the septum, have been observed by me. All the symptoms mentioned here are the result of a mechanical irritation by tobacco

dust or the like. These hard particles in the dust and smoke exercise a purely mechanical influence by getting into the folds, pockets and other parts, and thus causing congestion.

Secondly, it is the chemical effect by the nicotine, pyridin or other such substances that acts not only on the nervous system in general, but especially so on the mucous membrane of the nose and throat. As the smoke frequently is expelled through the nose, or is "swallowed," *i. e.*, is sucked into the trachea, it is not surprising that inflammatory conditions in these parts appear, and may even spread to the ears.

A pronounced intoxication by tobacco is comparatively rare. I have seen a number of instances with entire loss of taste and smell. Fortunately, they were all cured, although it took a long time in some of the cases. The fine taste for food is lost in many chewers of tobacco—a filthy habit. They may be entirely unconscious of this loss. But when it comes to a real intoxication and the sense of taste is gone absolutely, they wake up to the reality. I have seen this also in cigar dealers and those whose business it was to taste tobacco all day long.

More difficult to understand are the affections of the ear due to the abuse of tobacco. They occur not only in cigar factories where the workers constantly inhale tobacco dust or handle tobacco, but also in inveterate and excessive smokers. Chronic tubal catarrhs have been observed as well as auditory nerve deafness. Already in 1888 a Frenchman, Ladreit de Lacharriere, drew attention to these facts. Lately, V. K. Hart (*THE LARYNGOSCOPE*, p. 855, Nov., 1925) reported nine cases of eighth nerve lesions that seem to be important. The writer has observed one case that belongs to this category, which he may report later.

It is not my intention to go into details on the relation of tobacco to the development of malignant neoplasms of the throat. There is still no positive proof of such connection.

It may be well, however, to direct attention here to the frequent occurrence of epithelioma of the lower lip in pipe smokers. It occurs generally in men and on the same side of the lips on which the *pipe* is generally held in the mouth.

ALCOHOL.

This problem is far more serious as well as extremely difficult to discuss. It shall be my endeavor to adhere as strictly as possible to the medical side of the question, though it is not easy to avoid reference to the social and political factors connected with it.

Just as in the case of tobacco, some people cannot tolerate alcohol at all without detriment to their health. These, however, comprise such a small number in comparison to the host of others who are benefited by it that they hardly need to be considered. They generally give up alcohol as soon as they observe its detrimental effect. No doubt you all have seen such cases. I recollect one patient, a banker, who contracted pharyngolaryngitis every time he attended a big dinner where alcoholic beverages were consumed. Another case was that of a clergyman, who became hoarse after attending a banquet. They both gave up alcohol on my advice, and that happened long before the prohibition era.

Of greater import are the pathological cases, comprising those individuals who are harmed or even ruined physically and mentally by excessive and too frequent indulgence. Do I need to tell this audience of the evil consequences of such chronic addiction to alcohol on the system in general, and the upper air tract in particular? Everyone knows them and physicians have never denied them. But the country has been fed up in a disgusting degree with the tales of misery, the awful effect that "rum" has on humanity, etc. In a similar way "the reformers" used to speak of tobacco. In their opinion a teaspoonful of whiskey, a glass of beer or wine is sufficient to deserve severe punishment by the Lord Almighty. With the advent of prohibition we were promised that crimes would become less and less frequent, that the numerous nerve affections, venereal diseases, and even tuberculosis, would disappear or become negligible. As to the last class, the tuberculous, their number has indeed decreased steadily. But that began long before the days of prohibition and has practically nothing to do with the alcohol problem.

With reference to the crimes, I need only mention the fact that nowadays one cannot take up a newspaper without reading of terrible murders and daily holdups occurring not only in our metropolitan cities, but all over the country. These crimes, which remind one of the darkest days of the middle ages, were almost unheard of before prohibition. They seem the more cruel, since they are chiefly committed by educated men and women; that is, by individuals with a high school education. The saddest part of it, if I may say so, is that few of these criminals can be considered mentally defective.

As to the venereal diseases, has anyone noticed any difference in the number of such affections? If so, I have not heard of it.

Considering prohibition from every possible viewpoint, it must now be asked, not what good has it done, but how much more harm will result from it?

Physiological Action: First of all, let us discuss the physiological action of alcohol on the human system. No less a man than Prof. Ernest Starling, who is considered one of the foremost physiologists of the world, has written a book that created widespread attention, entitled: "The Action of Alcohol on Man." Starling quotes as follows from a report of the British Control Board: "Alcohol undoubtedly is a food as its combustion in the body can supply energy. But it cannot be stored in the system in altered form to be used as required as other foods are." Prof. Starling says there are certain cases where the action of alcohol is especially sought, as in diabetes, where a patient may be able to oxidize alcohol but not sugar. Alcohol is absorbed rapidly—20-40 per cent while still in the stomach; but all other foodstuffs only begin to be absorbed after reaching the intestines. Consequently, whiskey or wine or beer "may perform useful service as a food in cases of disease, weakness or old age when appetite is lacking and the processes of digestion and absorption are slow or fail altogether" (Adam H. Wright, *Am. Medic.*, Oct., 1924).

From my own experience I am convinced that at a certain period of life, in middle life or old age, alcohol is not only not contraindicated, but is of great value when moderately used and not misused. I am in accord with Osborne, of New Haven, who believes (*New York Med. Jour. and Rec.*) that a small amount of alcohol acts as a gentle narcotic to the brain, dilates the peripheral blood vessels, gives a feeling of surface warmth and warmth to the extremities, depletes the internal congestion areas, frequently starts a failing appetite, quiets an irritable heart, and gives a feeling of general comfort to these persons. Alcohol has a positive food value, and if sugar is added (unless sugar is contraindicated) a food is furnished which readily oxidizes and is of benefit to old people.

This is, as one may say, from a theoretical standpoint of a physiologist. Here is another opinion of a man in active medical practice. Says Dr. Porter (*Am. Med.*, March, 1926): Alcohol, like glucose, needs no digestive energy to make it available. Once in the alimentary canal, it begins to burn. The heat thus produced at once energizes the human organism as do glucose and fat or any combustible substance that can be burned within the system. Alcohol, so far as known, is the only substance so completely available. Hence, *its inestimable value; its great lifesaving power.*

In a practice of forty years I have met many a man, who year in and year out took a teaspoonful of whiskey before the main meal. That helped their digestion, increased their appetite and made them comfortable. Nowadays they suffer unless they can get whiskey

illegally. Does anybody blame these perfectly honest, law abiding citizens when they resort to such methods? In other instances alcohol acts like a true prophylactic. According to the law, we are not permitted to prevent disease by prescribing alcohol, only after disease has developed are we allowed to so prescribe. In spite of this, I have been and still am in the habit of advising my patients never to take a prolonged trip without a flask of whiskey. Where they get it from is not my business. I am conceited enough to believe that I know the needs of my patients better than any of the politicians assembled in Congress. One patient of mine traveled in the heat of the summer through the southwestern states. The heat sometimes was so intense that he could hardly quench his thirst by enormous quantities of iced waters, ice cream, etc. As he is not accustomed to such amounts of iced drinks, these would surely have affected his gastrointestinal tract, were it not for an occasional teaspoonful of whiskey. And he had no trouble in getting it in Colorado, Arizona, New Mexico and wherever he went.

Another somewhat different case is that of Mrs. K., age 76 years. She has been suffering for two years from a laryngeal carcinoma affecting one vocal cord. This is one of that type which sometimes remain stationary for years, similar to scirrhus of the mamma. Yet of late she began to suffer greatly. This old lady is accustomed to a certain kind of imported wine which she cannot obtain since the advent of prohibition. The family would be only too glad to pay any price for the wine, but could not get it legally, until one day, much to her joy, a bootlegger supplied a few bottles. Thus the honorable guild of bootleggers is called upon to save human lives against the will of the United States lawmakers and can be considered real benefactors of suffering humanity. *Difficile est, satyram non scribere.*

Alcohol as a Medicine: This subject has been referred to already. Many fanatics do not "believe in alcohol" under any circumstances. I can only say that they are either mentally affected like the Christian Scientists, who let their children die from diphtheria because they do "not believe in medicine," or that they have had little, if any, experience in medicine. Have all the observations made by some of our famous medical predecessors become valueless since the advent of prohibition? Were they not in some respects much keener and better clinicians than the present generation? Have you never seen the beneficial effect of alcohol in certain acute diseases or in chronic affections like tuberculosis? Just as little as I have ceased prescribing arsenic in tuberculosis, just as little have I discarded alcohol, even in laryngeal tuberculosis; of course, not given pure, but in a milk

punch, egg nog, etc. In quinsy sore throat the only thing some exhausted patients were able to take with benefit was milk punch. Alcohol in these cases checks tissue waste as in tuberculosis and helps to supply energy to the body. The fine distinction between food and medicine cannot be strictly drawn. "It is the combined efforts of alcohol in aiding digestion, improving the peripheral circulation, and promoting sleep," says Starling, "that makes its regular use so often helpful in maintaining life in the aged."

This author further states that alcoholic beverages in moderation promote good fellowship and used to add to the pleasures in a meal and to the enjoyment of life. He assumes that without alcohol at a meal pleasure is apt to wane and boredom to settle on the company. In short, he is of the opinion that moderate quantities of alcohol consumed daily will not interfere throughout adult life with bodily health and efficiency, while sufficing to produce the benefits and the increased pleasure in life which are the objects of the enjoyment of alcoholic beverages. Professor Starling believes that the advantages of alcohol more than balance its disadvantages.

Following these statements by a leading authority on physiology, it is hard to realize any harmful effects from the *moderate* use of alcohol. I venture to say that your fathers, grandfathers, relatives and most great men in this world have been users of alcohol, and yet you cannot but admire them. Why should the moderate use of alcohol be a crime now?

Has prohibition been an advantage to this country? Take any newspaper in any part of the United States and you will find every day accounts of this or that fight with bootleggers, of the arrest or discharge of so many dry agents, in a certain locality. Whether a man be elected senator or mayor or governor, you are sure to find a declaration of not how he intends to free the people of murderers and holdups, but what he is going to do to fight the wets. In the City of New York a police commissioner once declared he needed ten thousand more policemen to handle the bootleggers. Mind you: ten thousand men *more*. That is the way it goes in every city.

And how about the nation? According to the *New York World* of Feb. 27, 1926: "Prohibition prosecutions by the Department of Justice, under the national dry act have totaled 238,818! Of these cases, 217,231 were criminal prosecutions and 21,787 were civil suits. Collections of fine and civil judgments totaled \$20,000,000. Twenty million!"

Our army is mobilized, also our navy; we make laws for foreign ships, and all that for what? For a chimera. We want to drive

100,000 drunkards—if there are as many—out of the United States, or rather we want to improve them and punish 120 million law-abiding citizens by prohibition laws. Thus we create crimes and murders galore; we destroy the morals of law-abiding citizens, and corrupt the character and morals of young boys and girls.

Cases of chronic laryngitis and pharyngitis due to the abuse of alcohol have been seen in my practice much more frequently since prohibition than ever before. Drunkenness has increased in spite of all restrictions and prohibition laws.

To cite only one example, published in *Med. Times*, Sept., 1925: The New York State Department of Health reports eleven times the number of deaths from alcoholism in New York State in May of this year than in May, 1920. "The continued rise in mortality from alcoholism deserves special mention," says the report. "Statistics of mortality from alcoholism are quite incomplete. Since alcoholism has never been considered a respectable cause of death, the figures quoted above without doubt do not represent all of these deaths, a portion of them being hidden under other rubrics. The actual facts are very likely even darker." The report also shows that the deaths from alcoholism in New York City and state were decreasing before prohibition, but have been steadily increasing since 1920, so that in 1924 they were much more numerous than in 1918 and 1919.

While formerly in many families some mild wine or beer was served at the table, now the people resort to much stronger beverages. All kinds of such drinks are being made to an enormous extent in private families, and the working man, who formerly got drunk in a saloon, now takes some kind of spirits to his home and the whole family indulges.

Druggists can no longer be relied upon to dispense pure alcohol when needed, nor is it always possible to obtain the right quality in hospitals. One more example. When I was called, not long ago, to an out-of-town hospital, to demonstrate to the staff and several visiting medical men how to inject alcohol into the superior laryngeal nerve, I asked for 85 per cent alcohol. I told the patients that there would be considerable pain right after the injection. To my surprise none of them felt any pain whatsoever, and it was only later that it was discovered that the alcohol used was not 85 nor 80 per cent, but only about 3 or 5 per cent. When matters have come to a pass that physicians lose confidence, even in the alcohol dispensed on prescriptions or intended for office use, the condition is more than deplorable; it is criminal.

The *Journal of the American Medical Association*, that formerly seemed to be in favor of prohibition, says editorially: "The sur-

reptitious production and distribution of alcoholic beverages have brought about the possibility of the consumption of improperly refined distillates obtained from crude sorts of fermentations. The drinking of "bootleg" liquor may lead to the ingestion of substances of unknown chemical composition and physiologic action, in addition to the inevitable ethyl alcohol. The "alcohol question" of today has thus become, from a medical standpoint, even more complex than it was in the preprohibition period." (Nov. 14, 1925.)

I could go on talking until doomsday of the harm done by prohibition, but can find hardly one good word to say in its favor. Even some of the churchmen had to admit that prohibition has generally impeded their attempts in behalf of temperance. Reid, in the book cited above ("Action of Alcohol on Man"), insists that when governments tried to enforce prohibition they entered into a fight against nature, in which they were beaten in the long run. When, according to my estimate, at least 80 per cent of all physicians are against prohibition (not all of them openly, I regret to say), and when thousands of the best men in the United States, men in all walks of life and of international reputation, have the courage to speak and write against prohibition, we, as physicians, can only say in the interest of humanity: Away with that nefarious law. Teach your children how to be moderate in everything, how to lead simple, healthful lives; teach that in the schools, in the churches and in your homes, and the country will be far more benefited than by any prohibition legislation.

COSMETICS.

What has been said in reference to tobacco and alcohol applies equally to certain perfumes, cosmetics, etc., *i. e.*, some people have an idiosyncrasy against them. Naturally, such sufferers should never use any cosmetics. How about the others? It is known that in the United States several hundred millions of dollars are spent in the manufacture of such luxuries, and that they are exploited on an immense scale. More money per capita is spent for perfumes in the United States at present than ever before in any part of the world. In Greece and among the ancient Jews perfumes were used largely, but we have no record from physicians of those times as to their harmfulness.

What is the attitude of the physician on this question? As *American Medicine* remarked not long ago editorially, the esthetics of cosmetics are the concern of the physician only secondarily, but attention must be drawn to the damage they are doing. "It is not a question of whether women are using too much or too little, or whether their chosen shades are unbecoming, any more than it is for man to determine what, where and how much she may use of these adjuvants to

self-expression. Even if man could solve the 'why,' he would be impotent to change the facts. If lead is used in face enamels and creams, and lead poisoning results from 'flake white' in face powders, the poisoner is responsible. If alleged rice powders contain zinc oxid and bismuth subnitrate, or mercury is used in skin bleaches and hair dyes, the manufacturer is culpable. If arsenic, wood alcohol, pyrogallic acid, salicylic acid, and similar irritating and toxic material enter into hair tonics and hair dyes, and other preparations, one may expect dermatoses, but the fault lies at the door of those who capitalize esthetic impulses in a conscienceless manner."

Dr. H. N. Cole, who has made a thorough study of this subject, found that skin diseases caused by toxic cosmetics are on the increase. It is not my intention to discuss these affections. They are referred to only in so far as they affect the respiratory tract, and that happens not seldom. Cases resembling and erroneously diagnosed as hay fever are being recorded more and more in medical literature. But there are milder ones with less sneezing but some irritation in the pharynx that should likewise be mentioned here. They are generally diagnosed as "colds."

The following case may serve as an illustration for many similar ones. Mrs. L. M., age about 40 years, singer, writer, neurasthenic, etc., complained of having lost the resonance of her voice last summer. She was treated by a New York laryngologist, who opened the antrum through the inferior meatus. Then she was treated by her family physician "constitutionally," but her "colds" never entirely disappeared. On examination I found some pus still in the left antrum, which disappeared under conservative measures. But she still had her coryza on and off. One day I had a talk with her about cosmetics, etc., and finally found out that she had been using a certain liquid lip rouge. The "colds" disappeared when she left that off, but returned as soon as she resorted to rouge again.

Of greater significance is the case of Miss H. M., age 19 years, stenographer. Her nose has been swollen constantly so that she cannot breathe through it, sometimes one side and then the other. There is a discharge and she sneezes a good deal. All these symptoms start in the beginning of the winter, but, as she stated later on, she has such attacks every two or three months. The diagnosis of vasomotor rhinitis was made. On resorting to the protein tests, however, she was found to be positive to a face powder. This young woman had the courage to leave off all face powders and was cured completely.

H. K., another young woman, was suffering from hay fever. She was sensitive to oris root, and used face powder. I advised her to apply rice powder instead, and to put some cotton into the nostril when using the powder. I have not heard from her since.

During the last three years I have happened to see only comparatively few patients with vasomotor rhinitis. Yet in this small number observed in private practice there were no less than eight cases that gave positive protein tests and these were evidently due to face powder or one of the other cosmetics used by women. If you search for such cases, you will certainly find them in clinics as well as in private practice.

Bronchial Asthma: One of the worst cases of bronchial asthma I have seen occurred in a woman age 54 years. She has had five children, all of whom are living and healthy. Aside from an arthritis, she had been quite well until fifteen months ago this terrible affliction developed. In the upper air tract, little that was abnormal could be noticed, but her digestion was bad and she had not enjoyed a good night's rest for the last three weeks. Her lips were cyanotic, and she was so debilitated that she could hardly stand up. Yet before coming to my office she had found it imperative to put a great deal of rouge or something similar all over her face. This fact was so conspicuous in this instance, most likely because she had not been strong enough to do it well, that my attention was drawn to it immediately. On further examination, she was found to be positive to this rouge. After discarding all cosmetics she felt greatly improved, but her nervous exhaustion was so marked that it required an ocean trip to restore her completely.

The few cases cited above may be sufficient to again draw attention to the disastrous results from the use of cosmetics in some instances.

In conclusion, I would say that from a medical or rather laryngeal point of view I see no reason why anybody should give up tobacco or alcohol, if it does no harm to him. The use of either one of them or both in moderation by millions of people is proof enough of its harmlessness, nay, in many instances, beneficial effect on the human organism. The abuse of tobacco and alcohol has been and always will be condemned.

From the use of cosmetics the writer has not seen any good at all. They are to be condemned from every point of view.

24 West 88th Street.

TEMPOROSPHENOIDAL ABSCESS WITH WORD- DEAFNESS, HEMIPLEGIA AND HEMIANOPSIA.*

DR. J. D. WHITHAM, New York City.

Gus N., age 34 years, white, laborer.

Past History: Possible history of chancre "years ago." No treatment was ever given for this condition. Has been successfully operated on for congenital bilateral ptosis.

Recent Illness: About Feb. 1, 1925, he had a severe pain in his left ear, followed by aural discharge and mastoiditis, for which he was operated upon at the Bronx Eye and Ear Infirmary on Feb. 10, 1925. He left the hospital five days later and about three weeks later the mastoid wound healed. There has been a scanty discharge from the auditory canal ever since and he has had almost continual headache, involving the whole head, but worse in the left temporal region. A neurologist was consulted on March 1. He made a tentative diagnosis of paresis, which he based on the history of a chancre, a speech defect and a condition of well-being with boastfulness (euphoria). Though on the point of committing his patient to an asylum, he suspected the possibility of an otogenic lesion and asked me to see him. I sent the patient to the New York Eye and Ear Infirmary at once and he was admitted on March 5, 1925. As soon as he entered his room at the hospital he tried to jump out of the window and was so difficult to manage that two male nurses were employed.

Examination on Admission: Patient is a muscular, robust young man with a flushed face, an excitable manner, being alert one moment and mentally dull the next. It is difficult to hold his attention. He is obviously suffering severely with a constant headache, which he says is over both eyes. Temperature 99°, pulse 50, respiration 24. He speaks spontaneously at times and in a silly, pleasant, good-humored way, but it is not always possible to understand all he says because of the misuse of words. When shown a slipper he called it a "pair of stockings." He called a watch a "letter;" a "pen," "brown and white," but named a handkerchief correctly. He correctly picked up objects when named and asked to do so. When asked where he was he said "car block." He gave the day and hour correctly, but

*Read before the New York Academy of Medicine, Section on Otology, Nov. 12, 1926.

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said the year was 1923. He said he had been in the hospital a "couple of days" when he had been there one hour. He could not remember names given him after two minutes nor could he repeat test phrases. He did not know his age or birthday. His gait was unsteady and when the Rhomberg was tried he fell back and to the right.

He had a slight rotary nystagmus on looking to the right, but none when looking in the other direction. There were no ocular paralyses and the pupils were equal, reacting normally. His ocular fundi were normal and the perimetric fields could not be established, due to the impossibility of holding his attention, but a strong suspicion of an hemonymous hemianopia for form was entertained. Knee jerks were active and equal. Ankle clonus was slightly sustained on the right but not on the left. Babinski test was negative. There was a slight intention-tremor of the right hand. There was no adiodokokinesis or hypermetropia. No motor or sensory changes were noted other than mentioned.

The morning after admission to the hospital his attention could only be held with the greatest difficulty, he was much more irrational, slightly drowsy and physically weak. Then a slight rotary spontaneous nystagmus was noted on looking to the right or left. There was no spontaneous past-pointing. The left ear was totally deaf and the cold caloric test gave no responses after $4\frac{1}{2}$ minutes. The right ear was normal. A healed left mastoid wound was noted. No discharge was present in the auditory canal, but the bony canal wall was very narrow, almost entirely masking the drum. Percussion of the skull showed a definite area of tenderness above and behind the mastoid.

Laboratory Findings on March 6, 1925 (the date after admission): Hgb., 100; R. B. C., 5,000,000; W. B. C., 7,100; small mononuclear, 35; large mononuclear, 4; transitionals, 1.2; poly., 58.2; eosin, 0.8; mast., 0.4; myelocytes, etc., 0. Urine negative.

March 7, 1925: *Spinal fluid*: clear, faint traces of globulin. Fehlings is reduced. Culture and Wassermann negative.

A diagnosis of a left temporal lobe abscess was made because of the following findings: 1. Sensory aphasia. 2. Severe continued headache. 3. Attention disorder. 4. Probable presence of an hemonymous hemianopsia. 5. Exaggerated knee jerk and ankle clonus in right leg, indicating irritation of left motor area. 6. Slow pulse.

On March 6, after 18 hours of observation by me, the mastoid wound was reopened under ether. A very large area of middle fossa dura and of sinus had been exposed by the previous operation. Devoid of pulsations and covered with unhealthy-looking granula-

tions and evidently under pressure, the temporal lobe bulged into the mastoid cavity. A careful search was made for a stalk or fistula without success. A $\frac{1}{2}$ -inch incision was made through the dura at the point of greatest bulging and a brain knife was inserted for a distance of $1\frac{1}{2}$ inches upward and backward. At the distance of about 1 inch a slight feeling of resistance was met, the equivalent, perhaps, of cutting through thin writing paper, and a distinct cavity was entered. A grooved director was inserted alongside the knife and by slightly moving the former the abscess was allowed to evacuate itself. About ten minutes was spent in this last manouever and 4 ounces of creamy, white pus was removed, which was found to contain a pure culture of a long chain streptococcus. A fenestrated rubber tube, 18F in size, was gently inserted, the knife being removed first and the director used as a guide. It entered to a depth of $1\frac{1}{2}$ inches before meeting resistance and its distal end was anchored to the skin by a single stitch of silkworm gut. The wound cavity was lightly packed with iodoform gauze and left wide open. The operation was of 40 minutes duration, and the pulse was 100 when the patient left the table.

For thirteen days following the operation the patient was almost comatose, with periods of great restlessness, during which it was difficult to keep him in bed. Four days after operation an almost complete paralysis of the right arm, leg and face was noted. There was great difficulty in swallowing and deep coma. Tube-feeding was resorted to. The discharge from the wound was enormous and on the sixth day the drainage tube was removed and one of larger calibre was inserted. The wound was gently irrigated with hypochloride solution twice a day and gradually larger calibered tubes were inserted until the final tube used approximated about $\frac{3}{4}$ -inch in diameter. On the eighth day the patient seemed stronger and a little more rational. On the ninth day he was worse and could scarcely be aroused, and on the eleventh day he appeared to be dying, his pulse being 120, the respiration very rapid and shallow and the paralysis more complete. On the seventeenth day, there having been little change, he suddenly had a chill followed by spasmodic contraction of the right arm and leg. He became cyanotic and his temperature was 103.2, pulse 100 and respiration 26. This condition, which lasted about two hours, was followed immediately by an astonishing change. The following morning he recognized the members of his family, was able to swallow and for the first time spoke rationally. By the twentieth day he could move his face, arm and leg, and by the thirtieth day he was strong and well, being normal in every way except for double

vision and an hemianopsia. The latter condition has persisted ever since and is probably permanent. The temperature after operation was irregular and ran from 98 to 101.2° until March 24, when it rose to 103.2°. Following that rise it was never over 100.2°, and since April 12 it has been normal. The pulse on admission was 50, and following operation the rate was between 70 and 100 until March 24, when it reached 124.

Since his discharge from the hospital he seems normal in every way. He has resumed his occupation of moving pianos and has not missed a day's work for the past fifteen months. The mastoid wound healed completely after two months. The auditory canal is very narrow and at times a scanty discharge is noted at the fundus.

The chief interest in this case is the hemianopsia. I believe almost all temporal lobe abscesses will show this symptom and its diagnostic value, when found, is beyond question. I can find no statistics showing its frequency in brain abscesses; in fact, in the large majority of reported cases no mention of perimetric studies has been made. This symptom is due to an involvement of the cuneopulvinar tract, sometimes called Meyer's tract, which is composed of association fibres from the cuneus. This tract is adjacent to the lateral ventricle and can scarcely escape involvement when the abscess is large or when the ventricle is distended. Cushing found this symptom in 33 of 39 tumors of the temporal lobe.

Lillie reports, in a series of 60 cases of temporal lobe tumors, 17 cases definitely localized by perimetric field defects only, there being an absence of any definite symptoms. Is hemianopsia not probably of equal diagnostic importance in temporal lobe abscess?

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